

The Joy of Growing Plants

L. H. BAILEY

The shadows of life grow long. They stretch back over eventful and confusing years. Great wars have been fought, the difficult discussions of peace spread their alarms, old friends have died, new names have come on the stage of life, accustomed ideas have vanished, and new subjects engage the people. Yet my plants remain, full of vigor, bright in their colors, bringing memories and mementoes of other lands; and they are silent.

These plants are desired for the joy and the surprise of growing them. The wonder of it grows with the years—how an inert item called a seed can spring into life and from it come an aspiring organism true exactly to its own kind and relationship even though planted half way around the world from the place of its origin and in soils and climates wholly strange to it. This is a perpetual miracle, none the less amazing because we are now so inquisitive about it with microscope and retort.

There are other incentives. It appears to be my part to try to understand the original species from which these plants come, so that we may know relationships and keep the records straight. I try to grow the novelties for this purpose; and to this end good herbarium specimens of all of them are made and permanently preserved, for reference and study.

My garden is small in the midst of a city, yet I have grown as many as eight hundred different things in it in a single year. I like to grow all kinds of a group or genus, and then devote the area to another group for a year or two or three, the former items having been discarded. The garden is in per-

petual change and is never orderly and showy. In this way I have grown all the tribes of pinks, of campanulas, of aquilegias, armerias, aconites, and others. This year I have had several outside fields devoted to pumpkins and squashes and gourds, some of them in Florida, Louisiana and southern California. For many years I have thought myself informed on the species of these plants; but now as I grow them from Mexico and Bolivia and Argentina and otherwheres I am convinced that we are far short of understanding them as to their species.

All this work, with herbarium specimens, photographs, seeds, notes is botanical, and may be uninteresting to the horticulturist, and of course it cannot be popular in nature; yet the plants I work with are in great part horticultural, and I consider myself still a horticulturist as well as botanist. I do not now grow plants for display or for exhibition or for competition or for publication in the gardening journals; my fascination lies in other lines, and I publish my conclusions as technical contributions.

One of my satisfactions is what I call a box-garden. It is a crude affair on a slope to the south, of four runs or rows between boards on edge and cross-pieces, making sixty compartments or boxes about 12 by 15 inches. A roof or screen of wire mesh is put over it in summer, to protect from dashing rains and scorching suns and early autumn frosts. These boxes are always full of something or other; this year half the boxes have grown things of which seeds were sent from South Africa; I do not yet know what all of them are. It is now early October, and

already seeds from here and there are dropping into containers to be planted in the box-garden or elsewhere next spring, and no questions asked.

As example of the scant knowledge of the natural species involved in origin of horticultural varieties I cite the case of the brambles. Here are all the cultivated raspberries, dewberries, blackberries. I have grown many of them. Most of the blackberries are known to be from stocks native in this country. For many years I have been making collections of herbarium material in this genus *Rubus*, and at present have more than 27,000 mounted sheets of them; effort has been persistent to make specimens that really and truthfully represent a blackberry bush or a dewberry vine. For the past five years I have given special attention to a monography of North American *Rubus*, and the last fascicle of the publication is now on the press. Heretofore we have recognized about 80 species of *Rubus* in North America, but now I have described about 400 species, new and old. Much breeding has been undertaken heretofore in *Rubus*, but the published results as to specific parentages will now be of little avail. Per-

haps future breeding may have a somewhat accurate basis. Of course some of the horticulturists and botanists will not accept the new species I have described, but that will make no difference with the facts in nature. Some writers undoubtedly will reduce the number, making some of them synonyms or duplicates of others, which may be easier than trying to understand them; but the practices in crossing and breeding must in any case take a new turn.

One of the outstanding satisfactions in the growing of plants is to know what you have. Every one of the main groups of cultivated plants undoubtedly abounds in errors. Somebody must attempt to straighten out the nomenclature and relationships; this requires slow and patient study. It defines the bases of horticultural work.

The joy of growing a plant lies in the mind. Therefore we understand why every person finds satisfaction for himself or herself, in any neighborhood or climate. It should be part of public education to stimulate the desire to grow plants. Satisfactions are in the nature of the case.

Some Annuals in California

LESTER ROWNTREE

The method of gardening (if such it can be called) which I must fit into my manner of life, as well as the soil and exposure, limit the class of plants that grow for me. These plants must be sturdy self-reliant creatures of the soil, capable of standing on their own feet for they can rely on me for few of the attentions which most flowers have been led to expect from their growers. In the spring they receive chance weedings, during the summer's drought some, but never enough, water is vouchsafed them, and transplanting and juggling of individuals goes on as I can snatch the time. It takes a rugged constitution to weather the gravelly soil, the winter storms, the summer drought and fog; and because of the demands on their resourcefulness, few of the many plants which have been called, have remained to see it through. Without this trial and error course it would have been impossible to find out which perennials could stand up under such taxing conditions and which annuals could carry on as stop gaps.

But the number of faithfuls outlasting thirteen years of neglect is surprisingly large and the list would be still greater if I had had time to ease a little the lives of the members of this enduring group of growing things. I rely a good deal on flowering shrubs and perennials but mostly upon bulbs and "hardy" annuals. I never know just what term "hardy annual" means in a state where frozen ground is known only to a relatively small group of gardeners, but what I mean here is that my annuals are the boys taking serious neglect and in spite of it staying with me by means of self-perpetuation.

My most weed-like annuals are not always the best loved. There is *Bidens grandiflora* (B. serrulata), seed of which I brought from Mexico and scattered along with those of other less persistent plants, from points far south. Sometimes I'm sorry I ever included this eighteen-inch king of selfsows but when, toward the end of summer (a time when plant life in California drags along doing its best to tide over until the coming of rains), old bidens, almost a year-round bloomer, continues to cheer with its flat five-pointed yellow stars, my drastic yanking out of seedlings reaches neap tide.

With a linum which came to me under the name of *L. campanulatum* I am much more tender hearted quelling it only when its tall straight stems get into paths or rise abruptly from flat mats of groundcovers. I love the soft yellow of its feathery bloom especially when it floats over a tiny maquis-chaparral sort of effect below the house where the dull pinks and deep creams of low brooms are conspicuous, or its mistiness waves above blue or white *Geranium pratense* or gives grace to clunky lavender *Erigeron glaucus*.

A hybrid marked, *Linaria alpina* from an English source is an ardent free flopper whose prettiness must be discouraged for it is a stronger and more insistent adventive than the type which is perennial and much smaller. This linaria looks to me like *L. tristis*, an annual. It has a wider range of color and many pleasant combinations; there are browns and pale yellows, tans and strong yellows, shades of purple-lilac and lavender in with its deep cream or yellow tones. This volunteer



Bidens grandiflora

keeps cropping up in the vegetable garden, a good place for the roguing of the unwanted in order to segregate colors I prefer.

I let many *Chrysanthemum mawii* seedlings remain in the vegetable garden, for this annual, which here behaves, when permitted as a perennial, has been a pet of mine ever since twenty years ago when it was quite unknown to the trade, it came to me from Africa. My only grievance against this feathery leaved free-lance is that here, in the richness and moisture the pampered kitchen garden occupants demand, *Chrysanthemum mawii* selfsows are less gray and look so much like seedlings and the young of the ever appearing indigenous *Artemisia californica* that I sometimes pull them out by mistake. Now, just as in Biblical times, seed falls on fallow as well as on fertile soil and it is sad, upon going from the vegetable garden at the back of the house, to the flowers outside my study,

to look down on *Chrysanthemum mawii* half the size of those I have just left. But there is something very delightful about these low silvery-gray little plants smothered in dark-centered flowers of soft orchid though I would feel better about it if I hadn't just seen how these North Africans enjoy the fleshpots provided for the vegetables.

Another chance resident in my beds of food is the native wind poppy. Not a common wild flower but one that is so much loved that it may have its way among the lettuce and strawberry plants. There the slender eighteen-inch stems of *Papaver heterophyllum* with their poppy foliage of delicate green hold nodding buds and deep apricot (almost buff) flowers each centered with maroon blotches ringed with bright orange-scarlet.

The Diamond flower, *Ionopsidium acaule* from Portugal makes a splendid gap filler between very low plants and is invaluable as a groundcover for small



Papaver heretophyllum

bulbs. It should not be crowded but it should be allowed to brighten the ground freely with its small four-petaled flowers of light violet-blue.

Many Africans take to my unpromising hillside. *Arcotis*, *Dimorphotheca* and *Felicia* species perpetuate their kind giving me interestingly colored hybrids and thriving so well on neglect that I am quite content not to dwell on the voluptuousness that might be theirs with proper garden attention. *Dimorphotheca annua* is low and starch white and *Felicia aethiopica* is one of my prize standbys because of the deep pure bright blue of its bloom. Several *Felicia* species grown together may produce attractive hybrids with quite unique variations in foliage shapes, width of rays and in colors.

While I must bring myself to remove a *Felicia*, I have never been troubled by *Nierembergia caerulea* throwing itself about too freely. Many years ago this now popular annual wild flower of Argentina was sent to me from England under the name of *N. hippomanica*. Mine is the type whose frail low mounds become covered with flower-cups having gray and a little purple in their blue, but hybridists have now given us many different shades. Nor have I ever had to thrust out many seedlings of one of the nicest of wallflowers, *Erysimum insulare* from the Santa Barbara Channel Islands. In sandy soil this perennial, which may also turn out to be biennial or even annual, is an eager selfstarter and on the shores of San Miguel Rosa Islands as well as in one or two places on the mainland, the leaf tufts of this low wide plant are awake with round clusters of fragrant yellow flowers. A gopher got my last seedling and when the government allows visitors to the islands I must re-

turn to these enchanting places for a new supply of seed.

But to get back to the true street gamins of the flower garden! Six of them are local natives and while their numbers round the house are kept down by stronger plants, they are within waving distance of brothers massed higher up on the hill. The tallest and most conspicuous of these is the cobweb thistle, *Cirsium occidentale* var. *coulteri*, never, I hasten to add, a pest. It is one of the most admired plants of this region for its cyclamen-purple blooms are nested in threads of silver. There is a crystalline quality to the picture when this luminous rises above a mass of *Gilia densiflora* the heavy heads of which are carried on stiff, wiry, slender one-foot stems. The flowers are often pure white but may be soft shades of pink or lavender.

In late July this couple is joined by myriads of the orchid-colored blossoms of *Godetia bottae* which sweep across the hills in broad patches of color. If given the space one plant, a foot tall, will fill a square yard with arching stems carrying drooping buds and large bowl-shaped blossoms. *Godetia cylindrica* from southern California gives the same garden effect though its lilac-lavender flowers have centers of yellow and purple.

The other triplet indigenous to these hills and encouraged to mix with my exotics, needs a little shade if grown where the spring and summer sun is strong. Chinese Houses, *Collinsia bicolor*, Cream Cups, *Platystemon californicus* and Baby Blue Eyes, *Nemophila insignis* are often found growing together and make a happy garden combination. The lilac-purple, yellow and white of erect Chinese Houses rises above the two lower,



Dimorphotheca annua



Cirsium occidentale var. *coulteri*



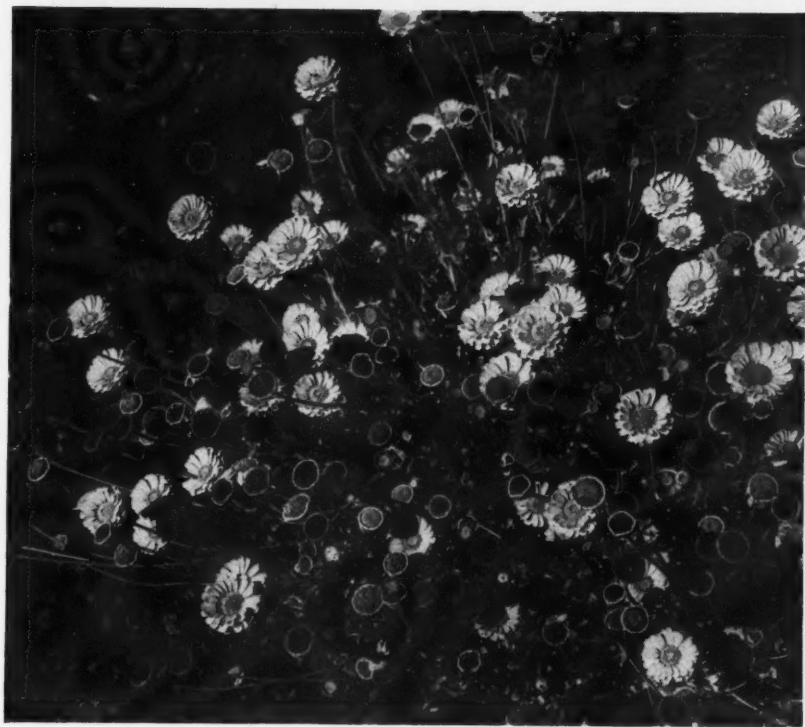
Collinsia bicolor (upper)



Gilia densiflora (lower)



Platystemon californicum



Nemophila insignis (upper)

Baileya multiradiata (lower)

spreading companions; the engaging little cream poppies are stamen-filled and have soft stems and leaves; *nemophila* adds the needed blue. Though *Nemophila insignis* is grown in almost every state, I get constant inquiries as to its culture and it might be a good thing to say here that in the East I had success and all summer bloom by sowing the seed outdoors in May and thinning when two inches tall. As a wild flower it is influenced greatly by the conditions in which it grows. In rich soil and shade it may climb over two feet into neighboring bushes and in exposure it may be a petite two inches. It comes in many shades of blue and one sometimes finds an albino.

I had meant, in these notes, to lay off California annuals for the attributes of this state are flaunted blatantly and without cessation. But some annual wild flowers keep getting in my way and I must add a few others that help to keep the ball rolling through the year. *Coreopsis maritima* is indispensable to my garden. All winter and well into summer it provides huge glistening yellow daisies for cutting. The white form of *Clarkia pulchella* is a charmer and so are the many color forms of dwarf *Linanthus androsaceus* especially when their pinks, oranges and pastel shades bloom beneath the blue Chinese delphiniums. *Lupinus densiflorus* in different colors is a grand standby and, for hot places where the soil is light, eighteen-inch golden *Baileya multiradiata* and tiny deep crimson *Mimulus bigelovii* are tops. And I could never get along without my flat pads of seaside *eschscholtzia*, *E. maritima*, with its silvery foliage and lemon-yellow flowers, orange-blotched in the center.

This haphazard way of using annuals is a far cry from growing them

as bedding plants though many species may be used by both schools of gardening. If the plant is to be expected to be on its own it should never be transplanted from the flat but the seed should be sown in the place where it is to operate. There it will come up when it feels the urge which is not always the time we expect. If any hoeing is done it should be when the seedlings are very small for even at that stage the roots are long, having already started out on their journey for moisture and food.

Cultivation has no place in the life of the audacious annual for this would disturb the plants or bulbs next door. Mother Earth and the elements have more to do with shaping the course of these unconstrained ones than the gardener has and it is interesting to notice results. A planting of bedding annuals can usually be depended upon to perform at a certain time. Not so the untamed. Surprises are always happening. Some years the time and amount of rain pleases one set of plants and disgruntles others just as it does the wild flowers of this climatically crazy state. There are banner years for the Africans and others when white *Omphalodes linifolia* and anagallis in various colors, Europeans both, are knockouts and I remember one year when all the species campanulas bourgeoned forth in unrestrained glee.

Gardening with this high handed group has its drawbacks. It doesn't make for tidiness for there is little huffing and puffing over dropped leaves and seed pods must of necessity, stand until they have spilled their loads. There is no evidence of manicuring and there are few straight lines; one just picks one's way across closely covered ground as through a mountain meadow or a flowery coastal sward.



Mimulus bigelovii

But pleasant unexpected pictures appear; a blue anagallis nestles close to a dwarf lavender in the crevice of a step; a lilac *Iberis gibraltarica* sprawls at the edge of a colony of shell-pink selfsown candytuft.

Self sowing annuals have taught me a lot. They have demonstrated power of which I never dreamed them capable and proved their strength and endur-

ance through exigencies no bedding plant could put up with. Even though many annuals are plants of only several months there are enough interloping species to provide year-round bloom. They leave no room for weeds for they themselves are the weeds. I'm all for 'em.

Carmel, California.

The Royal Horticultural Society

COLONEL R. F. DURHAM, Secretary

The early years of the nineteenth century saw a great horticultural renaissance stimulated to a large extent by the introduction of new plants, plants such as the Chrysanthemums, the Camellia and Wistaria. Thus it was that on 7th March, 1804, the Horticultural Society of London was founded by an enthusiastic small body of men, under the leadership of John Wedgewood.

Its first meeting took place at Messrs. Hatchard's bookshop in Piccadilly, London. The purpose of the Society was then defined (and this definition has not been altered) in the following words: "To collect every information respecting the culture and treatment of all plants and trees as well culinary as ornamental—to foster and encourage every branch of horticulture and all the arts connected with it." A Royal Charter was granted on April 7, 1809, and since then the Society has been known as the Royal Horticultural Society. Supplementary Charters have been granted—the last one being on July 9, 1928. It may with pride be claimed that it is the largest, and perhaps the most influential of all horticultural societies.

Its first President was the Earl of Dartmouth, and up to date in its long life of now over 140 years there have been but twelve Presidents, the present holder of the post being Lord Aberconway, whose garden at Bodnant, North Wales, is world-famed. From the small beginning of seven enthusiasts, the Society now numbers over 25,000 Fellows, although prior to the war this figure was much larger.

In order to carry out the principles laid down at its foundation, one of its

first undertakings was the establishment in 1818 of a garden in Kensington, London, for the purpose of raising seeds and plants received from abroad from correspondents and collectors, who were sent out or were subsidized by the Society to North America, China and Japan. James Douglas introduced many firs and pines from North America, whilst Parks and Reeves sent over the first Chrysanthemums, Camellias, Peonies, etc., from China, and this list can be extended including many other famous names. Coming to more recent days, the Society has obtained valuable new plants from such explorers as George Forrest and Kingdon Ward from Upper Burma and the Himalayas and the border lands of Tibet.

Special mention, however, should be made on this occasion of Indian collectors who have been honored by the Society with the gold Lindley medal—Major Lal Dhwoj, of Nepal, for his plant collecting, and he arranged for the dispatch of plants of *Primula sonchifolia*, which were successfully flowered after arrival; Professor Radamand Sharma, of Katamandu of Nepal, and Lala Anni Chand, Deputy Conservator of the forest of Bara Mula in Kashmir. It is from such men and from such sources that the gardens of Great Britain have been enriched with masses of beautiful flowers, Rhododendrons, Lilies, Primulas and Gentians—all too numerous to mention singly.

To return again to the activities of the Society in other aspects. On the occasion of the Society's centenary, in 1904, the Society acquired an Exhibition Hall, a Library and offices, built partly with moneys supplied by gen-

erous donors and partly out of its own funds. On this occasion, too, the Society acquired a new garden through the generosity of Mr. Hanbury, who donated the present gardens at Wisley, Ripley, in the County of Surrey.

Here at this garden there are many activities, besides its being the home of collections of good garden plants (for plants that withstand the climate of Wisley may be considered hardy in most parts of Great Britain, the colder districts excepted.) It is here that trials of new plants, garden plants, florists' flowers (such as Dahlias, Delphiniums, Carnations, etc.) are carried out, and adjudicated on. These new plants have already been selected by special committees from exhibits submitted to the Society at its Shows. Fruit and vegetables are treated in the same manner. In pre-war days, however, every year a program of invited trials was carried out and this practice will undoubtedly be revived in due course, but during the war the chief trials have been of vegetable seeds sent to this country from America and other parts of the world under the Lease-Lend Act. The seeds are tested for quality and purity of strain in order to guide the Government in its future purchases.

The gardens themselves are divided more or less into distinct groups. The Alpines are accommodated in a large rock garden, Alpine meadow and Alpine house, the aquatics in ponds and the borders thereof, there is a garden for roses, borders for herbaceous and annual plants, a wild section full of Rhododendrons and azaleas, where lilies grow well in the undergrowth, as well as the trial grounds for the various flowers, fruit and vegetables. In the gardens there is an administrative building and a laboratory, where a staff of scientists are employed in the first place to give advice on cultural matters to the Fellows of the Society, and then

to carry out research work on special problems concerning horticulture generally, more especially, however, on garden plants. It is, however, from the head office in London, in Vincent Square, that the main administration of the Society is directed, and here at the offices are found the Library and the Exhibition Halls (a second Hall of larger dimensions than the Hall of 1904 having been built in 1927, as the accommodation had proved insufficient for the growth of the Society, the size of its exhibits and the number of its exhibitors.)

The Library is called the Lindley Library, the nucleus of which belonged to Lindley, the botanist. It was acquired by the Society, and is certainly the most comprehensive horticultural library in Europe, and is constantly being enriched by bequests and gifts, besides purchases in the ordinary way. It is open for consultation by the Fellows, who have the privilege of borrowing books under certain conditions, and it contains about 20,000 volumes and pamphlets.

The Exhibition Halls, or at least one of them, are used for the purpose of its Shows, which under normal conditions are held fortnightly throughout the year. It is a source of great satisfaction to be able to say that, with a few gaps, they have during the war period been held more or less monthly. Perhaps the most important Show, and it is hoped that this will be revived next year, is the Society's great world-famed Spring Show, held usually in the last week of May at the Royal Hospital, Chelsea. At these Shows the Society's Committees, formed to deal with all kinds of plants, sit and adjudicate on the exhibits placed before them and awards such as "First-class Certificate," "Award of Merit," "Highly Commended," "Certificate of Preliminary Commendation" and "Selection

for Trial" at the gardens at Wisley are made. For the exhibits themselves medals in various grades, gold, silver-gilt, silver and bronze, are given, for plants, fruit and vegetables. A special medal, the gold Lindley Medal is also awarded for the introduction of new species or for plants of high botanical interest.

It will be of interest to mention that on the occasion of King George V's Jubilee, at the Chelsea Show in 1935, a tent was specially set apart for exhibits of plants representative of the Indian Empire, the Dominions and the Colonies, and on this occasion not less than over one hundred species of plants from India and Burma were specially staged, drawn partly from India, and partly from collections in this country.

Another of the Society's activities which must not be overlooked is its educational side, and its conduct of examinations in the home country. Junior, Senior, Teachers' and the National Diploma in Horticulture examinations are held. It is to be regretted that, owing to the necessity of holding practical examinations only residents in Great Britain can take advantage of these diplomas.

To the Society are affiliated the specialist societies, such as the National Rose, the British Carnation, the National Crysanthemum societies, etc., and in addition over 600 local horticultural societies throughout the country at home, and abroad. As representative of India there is the large Agricultural and Horticultural Society of India, Calcutta, of which Mr. Percy Lancaster is the Secretary, and with whom the Society is in constant correspondence.

Further, the Society publishes important works on horticulture. It owns the Curtis's Botanical Magazine, which was founded in 1787 and is the oldest illustrated colored magazine in the world. It issues a journal regularly every month, and from time to time prepares monographs and studies on various genres of plants. It was responsible for the large and important Index Londinensis, which is an index of the illustrations of plant life which has appeared throughout the more important botanical and horticultural literature. During the war it has published numerous useful pamphlets with regard to the production of food.

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Breeding Potatoes Resistant to Disease

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When the Spaniards invaded South America they found a large number of species and varieties of potatoes under cultivation, the tubers of which were used as a common article of food by the natives. The origin of these potatoes is shrouded in mystery, but they seem to be native to the American Continent, since their relatives are still to be found growing wild in the elevated regions extending from the southwestern part of the United States to the southern part of South America, particularly at the higher altitudes in Bolivia and Peru and in the coastal regions and nearby islands of southern Chile. All the species seem to require a cool climate, as they are found growing at high altitudes in regions near the Equator, and none is known to occur under tropical conditions.

It is interesting to note that despite the many expeditions that have gone into South America in search of potato varieties no wild potato has been found similar in every respect to the cultivated varieties. This might indicate that the natives had practiced potato breeding and culture perhaps centuries before the Spanish invasion. As a matter of fact, stores of dried potatoes (chuño) have been discovered in ancient tombs and ruined cities of Peru, showing that potatoes were probably a staple article of diet several centuries before the coming of the Spaniards. Furthermore, funeral urns closely modeled after potato tubers and resembling those produced by breeding and culture and not the wild forms

have been found in prehistoric Peruvian graves.

Just as the origin of the cultivated potato is not well known, so its introduction into Europe and North America is veiled in the obscurity of legendary stories. It probably was carried to Spain from Peru early in the sixteenth century. Many early introductions by explorers and travelers may have occurred. The large number of varieties that have been grown lends credence to this statement, because it is improbable that such a wide range of characters would result from breeding with only one or two introductions as original parents.

Regarding the introduction of the potato into Great Britain the two stories that have been believed to the greatest extent are the legends surrounding Raleigh and Drake (2). The first one states that "*Solanum tuberosum*, the common potato of our fields and gardens, was first introduced by Sir Walter Raleigh who brought the roots from Quito and caused them to be planted in his own garden at Youghal, Ireland." According to the Drake legend, "The famous English admiral Francis Drake deserves the credit for the introduction of the potato into Europe. On his return from Virginia in 1586, he brought thence the potato with him. Wishing to domesticate it in England, he not only gave some of the tubers to John Gerard but also handed a part of them to his own gardener telling him to plant the precious fruit in his garden".

From this point on the two stories are parallel. The plants were grown in the respective gardens and bore fruit. The gardeners, thinking the fruits, or potato apples, were the edible portions of the plants, tasted them and found them quite unpalatable. Each gardener confronted his master with the worthlessness of the new plants, and each was advised to dig them up at once, when to their surprise they found that the valuable parts had developed underground. Both legends are false.

Little is known of the introduction of the potato to North America. It is generally believed that the English colonists of Virginia and Carolina obtained it from Spaniards or from other travelers. However true that may be, potato growing in this country seems to have got its best start in 1719 from stock brought from Ireland and grown at Londonderry, N. H. Most of the stories of the introduction into Europe and North America may be legends, but the spectacular increase of the potato as a food crop is not legendary; it is one of the miracles of agriculture. It is probably less than 400 years since the potato was first introduced into Europe and about 225 years since it was brought from Ireland to be grown by the colonists in New Hampshire, and yet it is now one of the leading food crops of the world. The crop for the United States and Canada approaches a half-billion bushels, and the 5-year average (1935-1939) for the world crop was over 8 billion bushels.

Despite these results growers are not satisfied with the varieties they are trying to produce. They are too susceptible to the various potato diseases that are prevalent in potato-growing regions. Consequently, the search for new and better varieties has continued. Expeditions have gone into South America from time to time.

Three of the more recent of these were sponsored by the governments of the United States, Russia, and Great Britain. None of these succeeded in bringing back varieties that will compete with the established ones, but the new importations add to the wealth of material available for plant breeding work.

EARLY IMPROVEMENT OF THE POTATO

There is little information available regarding the source of the potato stock grown during the first 100 years after its introduction into the United States. It is believed that not many new varieties of importance were produced during that period. During the second century of potato culture in this country, however, there was great activity in the production of new varieties. Data reported on 228 of these varieties show that they originated in 21 states. New York and Vermont produced about 50 per cent of the total number. Of the 160 varieties whose date of origin is known 80 per cent were produced during the 40-year period, 1861 to 1900, and 48 per cent during the two decades, 1871 to 1890 (1).

Most of the men engaged in the early work were practical potato growers; exceptions were Rev. C. E. Goodrich, a clergyman of Utica, N. Y., and E. S. Carmen, editor of the *Rural New Yorker*. The work of Goodrich during the last half of the nineteenth century is worthy of special mention. He believed with others that the disastrous epidemics of late blight during the years 1843 to 1847, which caused serious loss to potato producers in this country and a famine in Ireland, were the result of a reduction in the vigor of the plants caused by long-continued propagation by vegetative means. He believed also that this vigor could be restored by growing plants from true seed. While he did

not succeed in the control of late blight by this means, he may be considered to have laid the foundation of potato breeding in this country by furnishing material to be used by other breeders.

The ancestry of 217 varieties of American origin can be traced back to Goodrich's *Garnet Chili*, a seedling of the Rough Purple Chili. They include several of the well-known varieties of commerce, such as, Green Mountain, Early Rose, Early Ohio, Beauty of Hebron, Prolific, and Triumph (3).

Some of these varieties, such as Green Mountain and Burbank, reach a high standard of excellence in yielding ability and culinary quality when grown under conditions to which they are adapted. These same varieties, however, are poor in other characters. Some are not adapted to a wide range of conditions; others have deep-eyed tubers, which cause waste in preparing the potatoes for cooking. All are susceptible to all or nearly all of the common diseases of potatoes, including virus diseases, late blight, early blight, common scab, fusarium wilt, rhizoctonia, blackleg, southern bacterial wilt, and ring rot. Control of these diseases requires a continual fight on the part of the growers and adds not only to the drudgery but to the cost of potato growing.

As a group, diseases caused by viruses are perhaps the most widespread and the most baffling. In this group are found mild mosaic, latent mosaic, rugose mosaic, spindle tuber, yellow dwarf, and leaf roll, with its accompanying net necrosis of the tubers of some varieties, notably the Green Mountain. The virus diseases occur in every potato-growing region of the United States, and it is probable that not a single field could be found entirely free from one or more of them. They are not new. Their effects have

been observed by growers for many years, but for a long time it was thought that they were due to "running out" or "degeneracy" brought about by growing potatoes year after year from the same tuber stock. It is relatively only a short time since it was discovered that these troubles are due to virus infection. It was early observed that some varieties did not run out so quickly as others or, as we now say, some varieties are more resistant to the attacks of certain viruses than others. Knowing that such differences must have a genetic basis, breeders in recent years have been working to obtain resistance to these diseases in combination with other characters of economic importance. In a number of cases they have achieved notable success as will be shown later in this paper.

Late blight, caused by *Phytophthora infestans* (Mont.) D By., adds more to the cost of producing the potato crop than perhaps any of the other diseases. In spite of the great cost of spraying and dusting to protect the crop large losses are sustained by the growers. In some seasons and in certain localities the disease causes very little damage, but all too frequently the losses run into millions of bushels. Epiphytotics occurred in 1927, 1928, 1932, 1936, 1938, and 1943. According to the reports of the Division of Mycology and Disease Survey, Bureau of Plant Industry, Soils, and Agricultural Engineering, United States Department of Agriculture, the heaviest loss from late blight (31 million bushels) occurred in 1928. That year blight was reported in 15 States, with the loss in New York estimated at approximately 13 million bushels. In 1932 the reduction of the crop was estimated at 9,230,000 bushels the greater part of which (9,058,000 bushels) was reported from Maine.

Again in 1936, 1938, and 1943, large losses occurred in Maine.

It is true that late blight can be controlled to a large extent by careful spraying with Bordeaux mixture, but despite the facts that control measures are being practiced more generally than ever, that spray equipment has been improved, and that spray programs have been more faithfully carried out large losses continue to occur, not only from reductions in yield but also from tuber rots initiated by the late blight fungus. These rots may develop on infected tubers in storage and in transit. Because of the uncertainty involved in blight years buyers are reluctant to purchase potatoes for storage purposes. Considerable expense is involved every time a carload of potatoes has to be regraded at a terminal market, and this happens all too frequently in bad blight years. These losses all affect the growers adversely.

Common scab, caused by *Actinomyces scabies* (Thaxter) Gussow, is another disease that causes losses in every section where potatoes are grown, and its attacks have become so severe in places that potatoes can no longer be produced profitably. The organisms causing this disease live over in the soil and are also carried on the tubers. Soil treatments have been tried, but they are costly and are not reliable. Treatments have been recommended that will kill the organisms on the seed potatoes, but no method has yet been devised that will protect fully the growing tubers from the soil-borne organisms.

A bacterial disease, ring rot, has recently come into prominence as a widespread menace to potato production. Sanitary measures and the insistence by state authorities that no seed be certified that has even a trace of ring rot in it have done much

to keep this disease under control. However, outbreaks are frequent in spite of all precautions, and heavy losses occur.

Millions of dollars are spent each year in providing ways and means of protecting the crop from the attacks of these and other diseases, but until recently comparatively little attention had been given to obtaining varieties that are resistant to their attacks. Results obtained indicate that by using genetic principles as a working tool it is possible to solve many of these problems by producing new varieties in which resistance to various diseases is combined with other characters of economic importance, such as shallowness of eye, desirable shape, good cooking quality, and high yield.

To understand the production of new varieties of potatoes it is necessary to know something about their reproduction. Potato plants are propagated in two ways: asexually and sexually. In commercial practice the new crop is grown from seed tubers, a method of vegetative or asexual reproduction. In most of the potato-breeding work plants are grown from the true seed produced in the fruits of the potato plant in about the same way that tomato plants are grown. Some varieties of potatoes, such as Katahdin, when grown in the North and cooler climates of the country frequently produce fruits or potato balls.

The same variety can be propagated vegetatively for years without change, so that selection within it is usually fertile. Occasionally bud mutations do occur, and a few new potato varieties have been obtained by that method, but such changes are too few and far between to be relied upon as the only source of variation in a breeding program. In a high percentage of the cases, too, the changes are of minor importance. Most of those observed



Figure 1. Potato plants showing clusters of fruits or seed balls. Some varieties in northern cool, long-day climates produce seed balls abundantly.

have been in the color of the skin. There are a number of instances where the red tuber loses part of its color and becomes "splashed", or all of its red color and becomes white. Purple tubers may become red, purple splash, or white. Other examples are a red-tubered sport from a white-tubered variety, or a fully colored variety from a partially colored one. Mutations involving more than one character in the same individual are extremely rare. That the occurrence of such mutations has not been an important factor in the development of potato varieties was shown by Clark (1), who reported that of 380 varieties that originated in the United States and have at one time or another been introduced in commercial

trade 93.3 per cent were of seedling origin and only 22, or 6.7 per cent were reported as so-called sports or mutants. Of the 22 varieties reported as sports, 4 are white-tubered from varieties with colored tubers and 4 are late-maturing variations found in early varieties. The meager information regarding the other 14 furnishes no basis for determining whether they were actual mutations, or admixtures carried in the seed stock, or volunteers that had persisted in the soil from some preceding crop. Even though only a few varieties have arisen as the result of somatic mutation, this is still a source of variation that cannot be ignored entirely by the plant breeder. On the other hand, since it is quite



Figure 2. One corner of the greenhouse of the Plant Industry Station, at Beltsville, Md., showing potatoes in full bloom and a technician pollinating the flowers

impractical to make much improvement by selecting tubers of a variety with the hope of getting something new, the plant breeder must resort to the use of seed and seedlings to get a very wide range of variation.

Many people who live in the South or where the climate is hot and dry have never seen a seed ball on a potato plant, and not a few are quite surprised when they first discover one. On the other hand, in northern cool, long-day climates some varieties of potatoes produce seed balls in abundance (Figure 1).

The seeds are the product of sexual reproduction and are found in the fruit which is quite similar to a small tomato. Each fruit may contain 200 seeds or more, and these seeds will produce plants that are quite different from each other. Most of these seedlings are undesirable from the com-

mercial standpoint, but occasionally one is produced that is an improvement over the old varieties.

The potato is classified as a self-fertile plant, but there is much variation among seedlings and varieties in this respect. Under conditions of relatively low temperature and high light intensity, such as are usually found in summer in northeastern Maine, in the Great Lakes districts of Michigan, Wisconsin, and Minnesota, and at high altitudes, as at Estes Park, Colo., some varieties will produce seed quite freely from self-pollination; others will bloom profusely, and although they do not produce viable pollen they can be hand-pollinated and made to produce fruit. Other varieties are more perverse. Their flowers will open, persist for a few days, and drop. On still others the flower buds drop before they open.



Figure 3. Growing potato seedlings in 3-inch pots in the greenhouse.

Until recently sterility was one of the greatest handicaps of the potato breeder, but by selecting for fertility this stumbling block has been largely overcome. The environment problem has also been partially solved. We have learned to simulate in the greenhouse the summer resort conditions of the Northern States. At Beltsville, Md., this is done during the winter when the temperatures can be controlled. The long day is compensated for by the use of artificial lights to give the plants the equivalent of 17 to 18 hours of light. Under such conditions many varieties bloom *freely* (Figure 2). With a relatively large number of pollinators and a suitable environment we have been able to produce large quantities of seed.

The seedlings are grown to maturity in 3-inch pots in the greenhouse (Figure 3) during the winter and fall and the small tubers produced are distributed the following spring to various State experiment stations where they

are increased and tested to determine their value as potential varieties (Figure 4). Since problems and objectives in potato breeding often cut across State lines and involve large regions of the country, the work has been organized as a national project with about 35 State experiment stations and the United States Department of Agriculture cooperating.

The practice under this program is to send seedlings produced by the United States Department of Agriculture or by any of the cooperating State experiment stations to others States for trial. If, after sufficient tests, any seedling variety shows superiority to the standard varieties in at least one important character, such as yield, market quality, or resistance to a disease that is difficult or in some instances impossible to control, it is named and released to growers in the region to which it is adapted. As a result of this work, about 20 new varieties have been distributed during



Figure 4. A view of potato seedlings grown for increase and various tests at Aroostook Farm, Presque Isle, Maine.

the 12-year period just past. A number of these have increased very rapidly in yearly production; others have increased rather slowly; and a few have already fallen by the wayside. Last year about 30 per cent of all the certified seed potatoes produced consisted of these new varieties.

No variety has been distributed that will meet the needs of the growers in all the cooperating States, and it is doubtful if such an ideal variety will be produced in the near future. There was, however, a sectional demand for each one of the new varieties, and they have been increased against hard competition and very critical evaluation, because of special characters that give them a definite advantage over the old varieties. The Katahdin, the first to be put out, got its start in Michigan when it was found that under unfavorable growing conditions in the

latter part of the growing season it would outyield Rurals. The Chipewa, because it was somewhat earlier than the Katahdin, became a competitor in Michigan and spread to Wisconsin and Minnesota. Maine was interested at first in these two varieties only from the standpoint of seed tuber production for other States; but as a result of severe epidemics of net necrosis in the Green Mountain variety in 1938 to 1942, inclusive, and again in 1944, the acreage of these two new varieties for table stock production has increased very rapidly because neither of them develops net necrosis in its tubers. Extensive efforts are now being made to keep the Green Mountain from going out of production, but even if it does regain its former position as the most extensively grown late variety in Maine, it should be remembered that for at least 7 years the



Figure 5. A field of Sebago showing the upright vigorous vines.

new varieties saved the industry in relatively large portions of the potato producing sections of that State.

Sebago, another new variety, has made a phenomenal record. From less than 10 acres harvested in 1938 it multiplied until in 1944 approximately 1,800,000 bushels of seed of this variety were certified. It has, however, spread to certain sections where it is not well adapted, and it would not be surprising to see it decrease somewhat in production. Sebago was released not because it was perfect but because it had the best combination of characters available at the time. Its vines are upright (Figure 5) and more resistant to late blight than those of the commonly grown commercial varieties, although not nearly so resistant as some of the seedling varieties under test at present. It produces, when properly grown, high yields of smooth, shallow-eyed tubers (Figure 6). The

tubers are resistant to rots initiated by the late blight fungus, one of the most important characters, and it is more resistant to common scab than Irish Cobbler or Green Mountain. Sebago is immune to mild mosaic in the field, and trials in New York and Wisconsin have shown it to be resistant to yellow dwarf. It is grown almost exclusively in the Hastings district of Florida because of its high yields of marketable potatoes, its late blight resistance, and its resistance to brown rot, a bacterial disease also referred to as Southern bacterial wilt. The Sebago shows resistance to more diseases than any other variety in production in the United States and furnishes a good example of what the potato breeders are striving for. It will take some time to get just the varieties of potato we are striving for, but as new varieties are produced that are superior to present commercial vari-

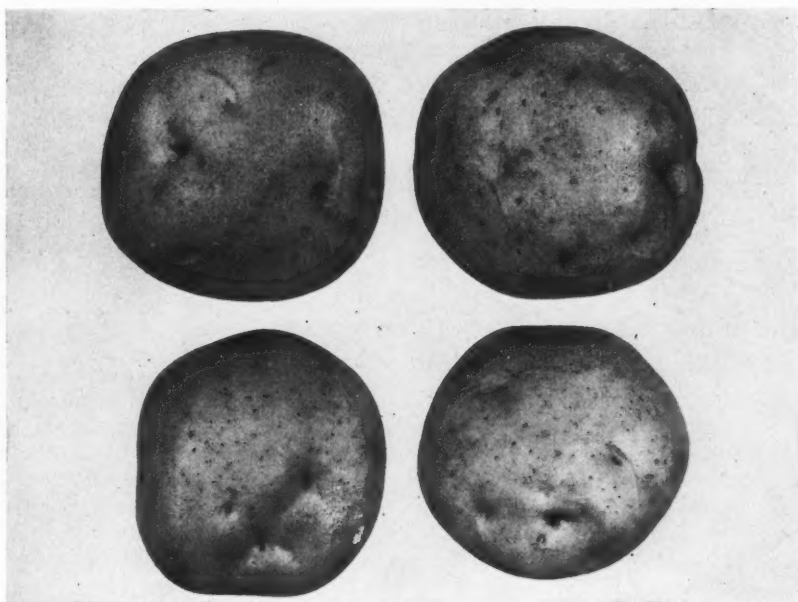


Figure 6. Tubers of Sebago showing their smooth, shallow-eyed character.

eties in at least one important character they are distributed to growers.

A list of characters that are now available to plant breeders in this country would include: Wide adaptation; variation in time of maturity from very early to very late; desirable shape of tubers with the tendency to hold that shape under a wide range of environmental conditions; shallow eyes, making it easier for the grower to brush or wash the tubers before marketing them and resulting in less waste in preparing them for cooking; high yielding ability; and correlated with dryness of flesh, a quality preferred by many consumers in the United States. In addition, we have varieties that are highly resistant to one or several of the following diseases and insects: Mild mosaic, latent mosaic, rugose mosaic, net necrosis in the tubers caused by current-season infection

with the leaf roll virus, yellow dwarf, late blight of the vines, tuber rot initiated by the fungus that causes late blight, common scab, potato wart, rot, ring rot, hopperburn, flea-beetle injury, and aphid injury. From the standpoint of the plant breeder this is a formidable list, and the list continues to grow as new varieties and species are being introduced from many foreign countries. It is possible that if enough work is done some degree of resistance to every one of the diseases and insects that attack potatoes can be found. The characters that are now available are not to be found in any one variety but are distributed among a relatively large number of varieties and seedlings. Most of them are not found in the old commercial varieties, but the majority of them should be incorporated in the varieties of the varieties of the future. Some of the

new varieties now under test show new combinations of characters, which a few years ago were thought to be improbable, if not impossible, to obtain. Some of these combine earliness and good cooking quality with a high degree of resistance to late blight in both vines and tubers; others have earliness and high market quality combined with scab resistance. One has high yield and good market and cooking quality combined with ring rot resistance. Still others that are in the preliminary stages of testing show combinations that should make them more valuable to growers and consumers than any heretofore distributed.

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New Palms in Florida

H. F. LOOMIS

U. S. Plant Introduction Garden, Coconut Grove, Fla.

Palms long have been the subject of active introduction in Florida and although many species, of economic value in their native country, have been brought in, this aspect usually has been of secondary importance, and it was for their beauty that the attempt was made to establish them here. The success of such attempts is everywhere evident and the number of exotic species that are being grown in one part of the state or another today runs into the hundreds. They are of very diverse size and form and their adaptability is so great that at least one or two species may be found in even the most unusual situations, and where growth conditions are more favorable, scores of kinds thrive.

The successful establishment of palms new to this country is of interest to private and commercial gardeners alike as increasing the possibilities for selective planting to get desired effects. Just what constitutes success may be a matter of some difference of opinion, but the bringing of a new palm from a tiny seedling, through the various perils it must undergo, to the stage where it flowers and possibly produces fruit is not without its thrill of accomplishment. Palm seeds generally are quite perishable and do not survive long unplanted, so that the introduction, from remote corners of the world, of seeds that will grow may be difficult, and repeated introductions often are required before viable seeds are obtained. Thus the production of fruits by a rare palm in this country makes introduction of its seeds unnecessary and insures its wider and more rapid distribution here.

Within the last year or two several palms never before successfully grown in Florida have flowered in the U. S. Plant Introduction Garden, Coconut Grove, Fla., and one of them has produced seed. Four are of economic importance in their native land while the others appear to have had few if any special uses. Here, with high land values and high labor costs it seems quite unlikely that any of them can be grown for their commercial products, but each has its attractive features that justify wide planting for the ornamental value alone.

Trithrinax brasiliensis Martius is a relatively small, single-trunked, fan-palm of slow growth that eventually reaches a height of about 12 feet so that it is an ideal plant for patios or for small dooryards where more rapid-growing palms would soon become too large. The dark green, flat leaves are borne on short petioles and are divided into 20 to 30 widely radiating segments that show little inclination to droop until quite old. The clasping leaf sheaths appear to be composed of coarsely interwoven fibres that are prolonged at the top of the sheath and form an outwardly projecting circlet of spines, giving the trunk a shaggy and somewhat forbidding aspect, that nevertheless, is curious and ornamental. Flowering may begin when the trunk is but few feet high, with several compound inflorescences produced simultaneously from the upper part of the crown of leaves. (Figure 1.)

When the flowers first appear they are creamy white and the entire inflorescence is thick and very compact with each branch of flowers protected by its



Figure 1. Flowers of *Trithrinax brasiliensis* on the first morning of their opening.

own creamy white sheath or spathe. At this stage and for several days thereafter, while the inflorescences remain white and are elongating, they have an unusual and striking beauty. (Figure 2.)

This palm is native in the southernmost state of Brazil and adjacent countries to the west and thus is at home outside of the tropics. Seeds were received here from the Washington Office in July, 1934, under P. I. No. 105865, having been donated by Mr. David Barry, Jr., of Los Angeles, Calif. This appears to be the first record of the palm in Florida although this and one or two other species of the genus have long been planted in California. Our

plant, which flowered in September, 1944, was received from Washington without the above P. I. number, but is believed to be from the same lot of seeds. It produced fruits which did not mature, possibly because of the severe drought that occurred as they were developing. This plant and others bearing the P. I. number have made good growth and the species should be able to grow as far north as Orlando and possibly beyond.

In Afghanistan and western India at elevations of from 2,000 to 5,000 feet is found a fan-leaved cluster palm that may reach a height of 20 feet. It is one of the few palms of the world that have branching trunks, the large



Figure 2. The same Trithrinax 24 hours later, showing the rapid growth that the inflorescences have made and the general character of the palm.

stems, 6 to 10 inches in diameter, often dividing to form two branches, but from reclining stems, near or partly submerged in the ground, suckers or offshoots also are produced. This palm has the scientific name of *Nannorrhops ritchiana* (Griffith) Wendl., and grows in dense colonies in very arid country where winter temperatures may go well below freezing. Throughout its native land the palm has many uses and several names, the most common of the latter being "Mazri" or "Mazari." All vegetative parts of the plant supply fuel; the very young leaves, young inflorescences and the flesh of the fruits are eaten; matting, baskets, hats, etc., are plaited from the leaves from which fiber also is obtained for the making of nets, fine matting and the like; and the pierced seeds have some commercial value when used in rosaries.

Apparently the first successful introduction of this species into the United States occurred when seed was received from Rawalpindi, India, in January 1935 and sent to this Garden from where seedlings were distributed in 1936 and 1937 bearing P. I. No. 107-747. Our field specimens have grown remarkably well and one of them flowered for the first time in November, 1944, but no seeds were produced.

These palms are now about 10 feet in height but, with their single and divided trunks and numerous basal suckers, are nearly twice as broad and form compact clumps. Their light silvery-green color, resulting from a thin wax-like deposit on the petioles and both leaf-surfaces, instantly commands attention. Closer inspection shows all the newer leaves emerging from a peculiar, light, fluffy mass of salmon-buff colored wool that darkens somewhat and is shredded by the wind as the leaves grow old. On the youngest leaves long fibers are loosened from

the upper folds of the pinnae and remain hanging in a snarled mass for a short while. The leaves themselves are about five feet across, composed of 20 to 30 pinnae joined together along considerably less than their basal half with their outer portions continuing in the same plane and seldom drooping, so that since the leaves project rigidly outward the whole plant has a stiff, bristly appearance not unlike a magnified sea urchin. The large inflorescence bears a general resemblance to that of our common palmetto being composed of many branches produced along a central stem. The spadix is not axillary (intrafoliar) as reported by Blatter in "Palms of British India and Ceylon" (p. 83) but arises from the tip of trunk. The large inflorescence projects well beyond the tips of the leaves and bears small white or cream colored flowers. On a trunk that is about to flower the last few leaves produced are rapidly reduced in size and length, the final leaf being very small. It is not known whether the stems will die after flowering is finished, as does the Talipot palm (*Corpha umbraculifera* L.) to which the Mazari palm is related.

This curious and attractive palm undoubtedly is quite hardy and should be tried throughout much of the range where our native palmetto grows. Against a background of dark green its color makes a startling and effective contrast.

One of the most useful and striking palms of the world is the Palmyra palm (*Borassus flabellifer* Linn.) a native of Ceylon and India, with related species of the same genus growing in Africa, Madagascar, Malaya, and several of the East Indian Islands. The native uses of the type species are almost without number and of a variety that probably exceeds the cocoanut, although ranking second to it in actual

economic value. In writing of the diverse products of the Palmyra palm a Tamil poem usually is cited wherein 801 uses are enumerated among which are many foods, including a kind of sugar highly thought of in the Orient, unfermented and alcoholic drinks, clothing, building materials, household utensils, fuel, mattings, nets, etc., and numberless other uses. As early as 2350 B.C., Palmyra palm leaves were used by scribes on which to write and from this use the modern reference to pages of a book as "leaves" is thought to have arisen.

The palms arrest attention from the time their trunks are only a few feet high, but as many thick at the base, to half-grown individuals 30 to 50 feet high with a great rounded crown of stiffly radiating fan leaves. Finally when the palms reach maximum size and have their crown of leaves reduced and flattened, groves of them might be mistaken for our own old stands of native palmetto except for their much greater height and thicker trunks which are awe-inspiring to the visitor.

Harold Mowry, in his "Native and Exotic Palms of Florida," Florida Agricultural Experiment Station Bulletin No. 228, May, 1931, reports the Palmyra palm as having been introduced in Florida but no specimens antedating 1931 are known to exist. The only specimens known to the writer bear P. I. No. 98487 and are growing here from seed gathered by the writer at Georgetown, British Guiana in Feb. 1932. They are not expected to flower for several years.

From the Gambia of West Africa seeds of a *Borassus* were introduced in 1929 under P. I. No. 81073 and a number were planted directly in one of our soil-filled "pot holes" where they germinated and since have made better growth than *Borassus* specimens elsewhere on the grounds.

Upon introduction this palm was called *B. flabellifer* but more probably it is *B. ethiopum* Martelli, commonly known as the "Black Rhun" or "Ronnier" palm, as its appearance and native home differ from those of the Palmyra palm.

Apparently the two species do not differ notably in size but *ethiopum* is said to be less graceful and to have swellings of the trunk not found in the Palmyra palm. Our largest palm is now about thirty feet high with a trunk diameter at base of 44 inches. The great palmate leaves, light silvery green, are from eight to ten feet across with surface undulated, though not to the extent found in the leaves of *flabellifer*, which also are smaller. The petioles are heavy, six to seven feet long and with the upper margin on each side armed from base to apex with black, elongate, jagged processes whose outer edge is knife-sharp. Two of our palms flowered for the first time in April of this year, and both proved to be males, sending out several inflorescences from which curious thickened branches appeared, bearing on their surface the small male flowers. Since the sexes are in different palms the flowering of other specimens is awaited in the hope that females will be present and thus allow seed production.

Both of the foregoing species should grow well in South Florida as they are suited to limestone soils, but one of the drawbacks to the wide planting of these magnificent palms is the requirement of growing them in place, from seed, as it has been found impossible to transplant specimens of any size or age. Greenhouse production of plants will not prove easy because of the manner in which the seed germinates. The seeds are large, several inches across and over an inch thick, and from them a thickened hypocotyl is produced that penetrates well over a foot into the



Figure 3. Ten-year old Bismarckia nobilis with its first crop of fruits which are nearly hidden by the intervening leaf petioles.



Figure 4. The fruiting inflorescences, in foreground, rise from separate leaf axils of *Bismarckia nobilis*, while on the petiole guarding the upper inflorescence clusters of woolly fibers are evident at base and beyond middle.



Figure 5. The "Curua palm," *Attalea spectabilis*, 20 feet high at the time of its second fruiting.



Figure 6. Basal portion of "Curua palm" showing its almost trunkless condition, the thick-walled spathes and a large fruit cluster as well as a similar, older one.

ground and from near the base of this hypocotyl the first leaf is produced and eventually pushes upward and above ground. These hypocotyls are considered a food delicacy by Indian natives and great numbers of seeds are planted in beds for their production. Under greenhouse conditions, where plants are desired, single seeds should be placed in individual containers of considerable diameter and depth where the seed can send down its hypocotyl and the young seedling make unrestricted growth for a few months. Even with these precautions it has been found difficult to set such plants in the field and have them survive. Wide planting of these palms must await importation and placement of viable seed or production of a home supply which it is hoped our palms may provide.

A rare palm that bears rather close resemblance to the common species of *Latania* is *Bismarckia nobilis* Hildebr. et H. Wendl., a native of Madagascar where it grows to a considerable height. Seeds of this palm were collected there at Majunga in the summer of 1934 by Dr. Thomas Barbour of the Agassiz Museum, Cambridge, Mass., and turned over to our headquarters office in Washington where they received P. I. No. 106556 and were forwarded here. From the 11 seeds that arrived, two seedlings sprouted and these have grown until one of the palms, a female, has flowered for two seasons and the other is of a size where flowering may be expected. It is hoped that this latter palm will prove to be a male so that fertile seeds may be produced and allow distribution of this handsome species.

This palm, as shown in Figure 3, has a stout, naked trunk gradually diminishing in diameter instead of being rapidly narrowed above the broad base as are the *Latania*s. The leaves have much the same silvery gray-green color

of *Latania* leaves, but are a little larger and more open in appearance because they are less folded. They are held with little drooping on long unarmed petioles. Small, twisted patches of coarse fibers five or more millimeters in length are found on the under side of the midribs of the pinnae, on the basal leaf sheathes and beneath the outer half of the petioles. The inflorescences project from the axils of the leaves in the lower part of the crown and branch simply. The fruits that were formed without fertilization in 1944 were mahogany brown and about an inch in diameter, probably considerably smaller than fertile ones would have been, but they were decidedly ornamental as Plate 4 will show. Many of these fruits from the first flowering persist on the branches below the clusters that formed in the spring of this year and now have reached the size of the earlier fruits.

The two palms have made more rapid growth than do the *Latania*s and have withstood cold weather as well. They appear well adapted to limestone conditions and, when additional plants become available, it should be found possible to establish them throughout the southern half of the state.

The American tropics, especially Brazil, contain a large number of species of feather-leaved palms belonging to the genus *Attalea* and to closely related *Orbignya*. Some of these palms attain great size and have leaves 40 feet or more in length, thus surpassing all other leaves of the plant world. Other species, however, are very much smaller and are trunkless or nearly so but still with the characteristic leaves of the large forms, although smaller.

One of the latter group described by Martius as *Attalea spectabilis*, but later transferred to the genus *Orbignya* by the German palm specialist, Burret, was introduced as seed through the

Washington Office in 1926 and 1927 and given P. I. No. 79560. Although a native of Brazil this seed had been grown in the Buitenzorg Botanic Garden of Java. Another introduction of this species from Trinidad in 1932 under P. I. No. 97543 failed but one plant of the former number was received from Washington in 1929 and has been established in the field. Mowry, cited previously, indicates planting of an *Attalea* in Florida but is doubtful of its being *spectabilis*. In Brazil this palm has several native names, principal of which is "Curua." As with related palms its leaves are used for thatching and some oil may be extracted from the seed kernels for local use and possible export.

The "Curua" palm here now has its second crop of fruit. The entire stem of the palm is not over six feet in height but the central leaves project another 14 or 15 feet upward with most of the outer leaves sharply ascending with slightly arched tips. Figure 5. Only near the ground might the plant be said to have a trunk and this is encased in the old leaf-bases. The leaves have pinnae closely crowded along the dark purple rachis from tip almost to the base, the longest of them slightly exceeding four feet. The inflorescences appear from the axils of the leaves, being enclosed in long slender spathes that split lengthwise and allow the

flower spike to escape. These opened spathes are somewhat boat-shaped, very thickwalled, deeply channelled longitudinally on the outer surface and ending in a solid attenuated tip 8 to 10 inches long, frequently ending in a curve or hook. Similar spathes of other palms are being extensively used for decorative purposes and those of the "Curua" palm unquestionably will be much sought after when they become generally available. The flower spike, when it first appears, is held rigidly upright but as the fruits begin to develop their weight usually causes the stem to bend gracefully outward. (Figure 6.) Many fruits, about the size of a hen's egg but more conical, are densely crowded around the outer half of the flower stem, each fruit being directly attached to the stem by a short pedicel. Firm flesh surrounds the elongate oval and very heavily-walled seeds which contain from one to five slender, elongate and well separated kernels.

From the present crop of fruits, which appear to contain fertile nuts, it is hoped that a sufficient number of seedlings may be obtained to allow wide placement in the subtropical test portions of the state. Trunkless exotic palms are novelties that few gardens can boast and the "Curua" palm, with its arched, dark green fronds rising from near the ground, will be found one of the most beautiful additions.

Bamboos in American Horticulture (III)

ROBERT A. YOUNG*

THE HARDY RUNNING BAMBOOS

(Continued from page 291)

In this issue some more of the medium-sized and several of the truly giant species of the genus *Phyllostachys* will be considered. Like those illustrated and described in the preceding number of the Magazine, these bamboos endure minimum winter temperatures of around 5° Fahr. with little injury, though there is some variability in their cold resistance. At lower temperatures cold injury rapidly increases and, as has been previously stated, killing of the leaves, branches, and finally of the culms usually results at a few degrees below zero; injury to the rhizomes also may occur unless there is a good mulch of litter or snow.

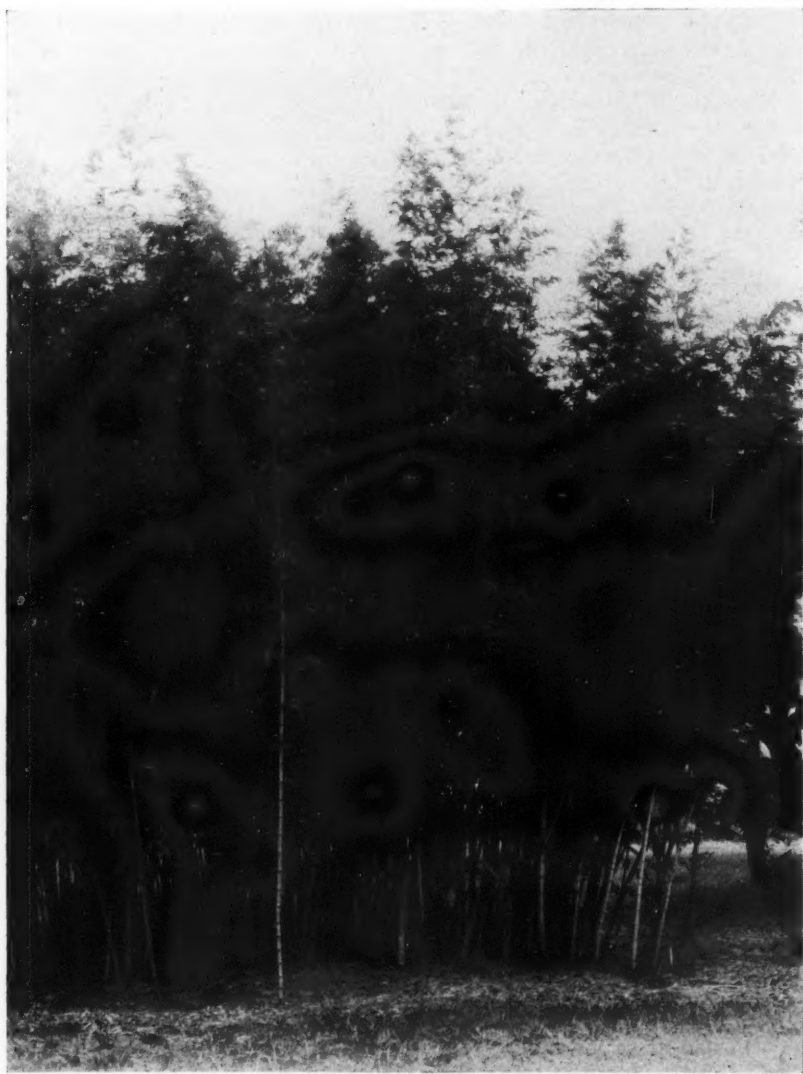
Phyllostachys dulcis McClure, a Chinese bamboo shown in the photograph on page 41, is a valuable edible species, unique in important respects. Of especial interest is the entire absence of the more or less bitter taste of the uncooked shoots, that is common to those of practically all other bamboos. It was in allusion to this character that the specific name *dulcis* was given, and this quality also suggests the common name "sweetshoot" bamboo as being appropriate. The culms are of larger diameter for their height than are those of any other known species of *Phyllostachys*, which results in the production of shoots of worth-while size for eating considerably earlier in the life of a plantation than with any of the other species. The further fact that, under equal conditions, shoots (and culms) of maximum size for the spe-

cies are produced after fewer years than with any related bamboo known adds materially to the potential value of the sweetshoot bamboo as a source of shoots for food. The mature culms are said to have little or no industrial value.

This species was collected at Tangsi, in Chekiang Province, China, in 1908, by the late Frank N. Meyer, agricultural explorer of the U. S. Department of Agriculture. It was reported to be the most popular of the edible bamboos in that region of China. Its local name at Tangsi is said to be Pah koh poo chi. The plant has an interesting history in this country. Received from China without scientific name, it was sent, among other species, by the Department to Mr. E. A. McIlhenny, Avery Island, La., where the plants burst into flowering after 2 or 3 years. As is usual with bamboos, the foliage was almost completely suppressed and also, as rather rarely happens among the species of *Phyllostachys*, the plants persisted in flowering until nearly all had perished. By taking a single remaining plant into the greenhouse and coddling it, Mr. McIlhenny succeeded in bringing it out of its flowering mood, and it became the source of all the material of the sweetshoot bamboo now in the United States. All the plants grown elsewhere had previously been lost.

P. dulcis as grown at the Barbour Lathrop Plant Introduction Garden has in recent years attained a height of 32 feet, with a culm diameter of 3 inches near the base. The culm sheath is almost perfectly smooth, is pale green

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Phyllostachys dulcis, the Sweetshoot bamboo, the common hardy edible bamboo of central China, at U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga. Culms of very large relative diameter—3 inches in 32-foot culms shown here.

to yellowish with small brownish spots and streaks when fresh, and dries to a straw color, the spots remaining. The "reduced blade" of the culm sheath is rather narrow, as in most other species of *Phyllostachys*, and is usually somewhat curled or crinkly. The leaves, usually 3 or 4 on a twig, are 2-6 inches long by $\frac{1}{4}$ - $\frac{7}{8}$ inch wide; they are medium green and smooth above and glaucous beneath, as in most species of the genus.

The sweetshoot bamboo was identified as *P. henryi* at the time of its flowering and was sent out under that name by the Department of Agriculture for a period in later years, but some two years ago the identity was questioned by Dr. F. A. McClure, the specialist on Chinese bamboos. He found "no discernible basis" in the vegetative characters for the identification and no flowers were available. He has therefore recently described this bamboo (Journ. Wash. Acad. Sci. 35: 285-286. Sept. 15, 1945) as a new species under the name *P. dulcis* used here.

P. nidularia Munro, shown on page 43, is a Chinese bamboo of medium-large size, attaining heights up to 33 feet. The new leaves in the spring are at first 3 or 4 on a twig but the lower 2 or 3 commonly fall after 2 months or so, leaving only 1 or occasionally 2 leaves on a twig until the following spring; the blades are 2-5 inches long by $\frac{3}{8}$ - $\frac{3}{4}$ inch wide. The leaf form and size among the several introductions that have been made vary considerably, perhaps even more than in the other species of *Phyllostachys* being considered here. An outstanding character of *P. nidularia*, and one by which the species may readily be identified with considerable confidence in the spring, when one has once become acquainted with it, is the pair of very conspicuous clasping auricles at the juncture of the culm sheath and blade; these auricles

are quite smooth and without marginal bristles. The sheath proper is green, often with noticeable whitish stripes converging upward toward the apex. The Department of Agriculture has a number of introductions of the species, apparently of at least 2 or 3 different seedling origins, — from Kwangtung and Anhwei Provinces, China. Some differences in apparent maximum height and in leaf characters among these various introductions are noticeable, and it is likely that some differences in the qualities of the young shoots for food and the quality of the wood of the mature culms may later be found. According to the notes of the collector, Dr. F. A. McClure, made at several points of collection in China, such differences in marked degree appear to have been observed by the Chinese. The split culms of *P. nidularia* are reported to be sometimes used by them for weaving. The internodes of the culms are longer than in many other species, those near the middle of a 25-foot culm being up to 18 inches. Their value for fishing poles and other industrial uses in the United States has not been studied but it is safe to say that they will serve as fishing poles, plant stakes and for other ordinary uses. A number of local names for this species in different localities of the provinces mentioned were recorded by Dr. McClure. At various points in Kwangtung Province the names Tai Ngaan chuk, Fa hok chuk (a variety with superior shoots), Kan chuk, So pa chuk, Kam sz chuk, Pat sun chuk, and Lak cha chuk were in use. (The last two names are from Honam Island, near Canton.) As may be surmised, "chuk" stands for bamboo. From a locality in the Lung T'au Mountains comes the name Nai chuk, and from Anhwei Province, Shui chuk. No English name for *P. nidularia* has yet been coined, and except for the prominent



Phyllostachys nidularia, a medium-tall and rather slender Chinese bamboo with edible shoots. At U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga.

auricles mentioned, at the apex of the culm sheath, there seems not to be any very distinctive character to suggest an appropriate common name.

P. meyeri McClure, another medium-large bamboo from China, is shown on page 45. It was collected by Frank N. Meyer in Chekiang Province in 1908, for the Department of Agriculture, but the record as to exact locality is lacking, for the same reasons mentioned in the discussion of *P. aureosulcata* in the October number. The common name "Meyer bamboo" has been adopted for this species. For a brief period the name "dwarf hardy bamboo" was used for it but as the name later seemed not to be either distinctive or particularly appropriate, it was dropped. No other collection of the plant in China has yet been made as far as known. The height of 35 feet for *P. meyeri* at the U. S. Barbour Lathrop Plant Introduction Garden, indicated in the legend for the photograph, has been attained only in very recent years, and there is a possibility that culms of somewhat larger size may yet be produced. The diameter of the larger culms is about $1\frac{7}{8}$ inches near the base.

It is scarcely possible to describe the Meyer bamboo in non-technical terms that will enable one to separate it easily and with certainty from several others. In most respects it closely resembles *P. aurea*, but it differs sharply in having none of the occasional crowding of the lower nodes of the culms that is rather frequent among the culms of the latter species. Also, the ligule (upward extremity of the sheath proper, inside the base of blade) of the culm sheath of *P. meyeri* is more brownish and a little more conspicuous than in *P. aurea*. The sheath itself is more or less smoky-spotted or blotched, especially on the upper part. In mature plants the leaves usually are 2-3 on a

twig and are rather narrow, 2-5 inches long by $5/16$ - $3/8$ inch wide. *P. meyeri*, having only recently been described and named (Journ. Wash. Acad. Sci. 35: 286-288. Sept. 15, 1945), has been sent out by the Department of Agriculture as *Phyllostachys* sp., for many years, first under the incorrect *P. I.* number 23234 (for reasons previously indicated) and later under *P. I.* No. 116768, which it now bears. It is a valuable bamboo for fishing poles, harvesting of nuts and for the very numerous other purposes for which its size would adapt it.

P. rubromarginata McClure is also a Chinese bamboo of medium-large size. Culms up to at least 37 feet in height are on record, though more often they are considerably smaller. A view of an area with culms up to 30 feet high, at the U. S. Barbour Lathrop Plant Introduction Garden, is shown on page 47. This plot was grown from plants collected on the banks of the West River, near Wuchow, Kwangsi Province, by Dr. F. A. McClure, for the U. S. Department of Agriculture. A plot at the same garden, grown from plants collected in Kwangtung Province, has produced culms of the greater height (37 feet) mentioned, while in one from another locality the maximum height thus far is only 25 feet. It seems likely that these plots represent different clones, of different seedling origins. The culm sheaths of *P. rubromarginata* are plain green, with a reddish margin, when fresh, and the specific name was suggested by the reddish color of the margin. The sheath dries to a fairly uniform straw color; it tapers to a rather narrow, truncate apex and is surmounted by a ribbonlike blade. The leaves are at first 3-4 on a twig but the lowest one falls early, leaving 2-3; they are somewhat broad for their length, ranging from 2-6 inches long and from $7/16$ - $15/16$ inch wide.



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Phyllostachys meyeri, from central China, named for the former agricultural explorer, Frank N. Meyer. A bamboo growing to 35 feet high, valuable for many purposes. Pole at left is 12 feet high. At U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga.

P. rubromarginata has not been much tested as yet for industrial purposes but it appears to be fairly suitable for light fishing poles and probably for use in harvesting nuts. A slight disadvantage is a tendency for the internodes to be a little curved, but for many purposes the almost imperceptible curve is likely to be unimportant. The internodes of culms 25 - 27 feet high range up to 15 inches in length. No common English name has been suggested for this species. In the locality near Wuchow, China, the usual vernacular name was reported as Koon yam chuk.

P. congesta Rendle, shown on page 48, at somewhat less than half its recorded maximum height, is one of the smaller of the giant species of *Phyllostachys* when it reaches its full size. A height of 43 feet attained several years ago was reported by Mr. E. A. McIlhenny at Avery Island, La., and this may have been exceeded since. This species is another of the early (1908) bamboo collections made in Chekiang Province by Frank N. Meyer, of which plants placed with Mr. McIlhenny were the only ones that survived. This is also one of the species for which the exact locality of collection is not now known. It should perhaps be stated here that the identification of this plant may possibly later be subject to correction, since there are several very closely related bamboos, similar in appearance, that may be involved and there is still some uncertainty as to whether our present one actually represents the type of *P. congesta*.

The plain green sheaths of the young culm shoots are so smooth and fit so closely over one another that they suggest fish scales. This has given rise to the name "fishscale bamboo." The character mentioned is of course in evidence only in the early spring, when the new shoots are in an early stage of

growth. Foliage specimens of this bamboo collected from culms of different ages seem to show exceptional diversity in size, shape, and shade of green of the leaves, though considerable variability in certain respects is of course found in all the species. The leaves, which are rather thin, are at first 3 - 6 on a twig but the lower 1 or 2 always fall before autumn; they are $1\frac{1}{2}$ - $4\frac{3}{4}$ inches long by $\frac{5}{16}$ - $\frac{3}{4}$ inch wide. The culm of the fishscale bamboo is rather short jointed, comparatively thin walled, and not very strong, so that its industrial value apparently will be low.

Phyllostachys sp., P. I. No. 146420, shown on page 51, as it is growing at the U. S. Barbour Lathrop Plant Introduction Garden, is one of the smaller giant species in respect to height, but the culms are exceptionally slender. A 45-foot culm—one of the tallest—has a diameter of only $2\frac{1}{4}$ inches near the base. The exact origin of this Chinese bamboo is not known. It was among the numerous other species collected by Dr. F. A. McClure for the Department of Agriculture, but when first closely observed at the above garden it bore the designation of another, quite different species, so that it had to be considered as a "stray." In culm-sheath characters it so strongly resembles *P. bambusoides* that for a time it was thought to be simply a form of that species. Later, however, Mr. D. A. Bisset, in charge of the garden mentioned, recognized several points of marked difference, including slenderness of culm and the exceptionally dark-green color of the upper surface of the leaves. The dark green contrasts sharply with the brilliantly glaucous under surface, especially when the lower surfaces flash into view in a breeze. The tall culms with their small diameters and the apparent toughness of the wood give this unnamed bamboo considerable promise for use in the har-



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Phyllostachys rubromarginata, a slender-culmed Chinese bamboo, at U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga. Tallest culms in this group are 30 feet but heights up to 37 feet are on record.



Phyllostachys congesta (left), and *P. vivax* (right background), two of the giant hardy bamboos of central China, in early stages of development on McIlhenny Estate at Avery Island, La.

vesting of pecans, and the straighter culms may also meet some of the special needs of fishermen for long slender poles. Many of the culms develop a conspicuous curve in their growth.

P. sulphurea var. *viridis* R. A. Young, the green sulfur bamboo, is a giant Chinese bamboo, said by J. Houzeau de Lehaie to have been introduced into Europe in 1856 and distributed to various points, including the Botanic Garden at Hamma, near Algiers. He also stated that a weak plant flowered at Hamma the following year, though no description of the flowers was made or any specimen preserved. The flowers are still unknown. A grove at the Barbour Lathrop Plant Introduction Garden, with culms up to 43 feet high,

is shown on page 49. Heights up to 16 meters (52 feet) for this bamboo, under the invalid name "*P. mitis*," were reported from France many years ago but there is some reason to believe that a larger and entirely different species (*P. edulis*) was confused with it. Two different clones of *P. sulphurea* var. *viridis*, from French sources, were introduced by the Department of Agriculture some years ago, one of which, shown in the photograph, is much larger and more vigorous than the other. At the Savannah Garden the smaller clone has not produced culms taller than about 15 feet, though it had been reported in France sometimes to reach 35 - 38 feet.

The culm sheaths of *P. sulphurea*



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Phyllostachys sulphurea var. *viridis*, a hardy giant Chinese bamboo with robust culms, first introduced into France and Algeria. Culms here are up to 43 feet. At U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga. -

The illustrations (but not legends)
on pages 49 & 51 are interchanged.

var. *viridis* are perfectly smooth both on the surface and the margins. The lowest sheaths when fresh are brownish yellow, those higher on the culm gradually merging into yellowish green; all are more or less blotched, spotted, or speckled with dark to light brown. The leaves are borne in 2's or 3's on the twigs and are 2-5 inches long by $\frac{3}{8}$ - $\frac{3}{4}$ inch wide. There are no published data on the physical properties of the culms, nor is there wide practical experience as yet in this country in using them industrially, but it seems likely that the culms of the more robust-growing clone will prove to have at least moderate value, including such uses as fishing poles and rug poles.

The green sulfur bamboo, as the name indicates, is treated as a variety of the sulfur bamboo, *Phyllostachys sulphurea*. The plant was first described (at the same time as *P. sulphurea*) by A. & C. Rivière, from Algiers, in 1879, under the name "*P. mitis*." That name was mistakenly based on *Bambusa mitis* Poir., a bamboo now unidentifiable but, from the description, known not to be any species of *Phyllostachys*. These circumstances made necessary the renaming of the so-called *P. mitis*. *P. sulphurea*, as stated in the preceding paper, is considered biologically to be a garden variety of the much larger, green-culmed plant we are here considering, but since it had been named in 1879, it was necessary to retain its specific name and, under the rules of botanical nomenclature, the entirely green plant, believed to represent the true wild species, had to be made a nomenclatural variety of the small, yellow-culmed plant. This was done in 1937 (Journ. Wash. Acad. Sci. 27: 343-346. Aug. 15, 1937). For a considerable time the name *P. mitis* was also misapplied to the bamboo we know as *P. edulis* (*P. pubescens*). Neither *P. sulphurea* nor

P. sulphurea var. *viridis* is believed to be grown in Japan, though some of the Japanese botanists apparently have in the past confused the name *P. sulphurea* with one of the yellow-culmed varieties or forms of *P. bambusoides*.

P. nigra var. *henonis* Stapf ex Rendle, which we may call the Henon bamboo — a name already adopted by Standardized Plant Names — is another giant Chinese bamboo, also cultivated widely in Japan. The Japanese name is Hachiku. A photograph of a small grove with culms up to 45 feet high, at the Barbour Lathrop Plant Introduction Garden, appears on page 53. Heights up to 54 feet elsewhere in this country are on record. The culms are a little smaller in diameter for their height than in most of the related giant species and are thinner walled, so that their industrial value is not very high. The medium-sized culms, however, have been used to a considerable extent in some localities for the harvesting of pecans, and they should be useful as rug poles and for other purposes for which culms of greater strength are not required. Smaller culms will serve for light fishing poles. The edible young shoots are excellent for eating and are reported to be esteemed in the Orient especially for the slight fragrance that is given off when they are cooked.

The leaves of the Henon bamboo are rather small—rarely 4 inches long or much more than a half inch wide; they are usually borne 2 on a twig, rarely 1 or 3. The new shoots in the spring, with what I have called their clear mauve-colored sheaths, surmounted by the vivid green, crinkled blades and deep-purple auricles and bristles, are very beautiful if one will take time to look at them a little closely. As to the color of the sheath, it can also be described in other terms. Dr. T. Nakai, for instance, describes it as light green-



Phyllostachys sp., P. I. No. 146420, an undescribed species of hardy bamboo from southeastern China, of promise for long, slender fishing poles and for harvesting nuts. Culms up to 45 feet high. At U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga.

The illustrations (but not legends)
on pages 49 & 51 are interchanged.

ish brown or light reddish brown, either of which seems to me not inappropriate. Altogether, this is a handsome bamboo. The late A. B. Freeman-Mitford (later Lord Redesdale) of England, in his highly informative and delightfully written little book "The Bamboo Garden" (1896) is lavish in praise of the grace, health, and generally excellent behavior of this bamboo in his garden. It is reputed to be, if anything, a little more cold resistant than most of its relatives, though in a favorable environment several others may outstrip it in speed of development to their maximum sizes.

Although *P. nigra* var. *henonis* was introduced into Europe in the late eighties of the last century by a French physician, Dr. Henon, for whom it was named, there is no known record of its having been successfully introduced into the United States and established until 1908, when Dr. David Fairchild, who was largely instrumental in organizing the work of foreign plant introduction in the Department of Agriculture, arranged for the importation of plants of this and two larger giant species from Japan. A first importation in 1904 apparently had failed at all points to which plants were sent. Dr. Fairchild had given especial attention to the more important bamboos cultivated in Japan in 1902, during a stay of several months studying the useful plants of that country, with his friend Mr. Barbour Lathrop. Both men became convinced of the potential value of the bamboos for growth and utilization in the United States, and Dr. Fairchild wrote an excellent and informative paper on the subject, which was published in 1903 as Bureau of Plant Industry Bulletin No. 43 (now out of print).

Quite briefly, I must mention that plants of the 1908 introduction of *P. nigra* var. *henonis* (*P. henonis*) were placed by the Department of Agricul-

ture with Mr. E. A. McIlhenny, at his Avery Island estate in southern Louisiana, among other experimenters, in 1910, and that, again, his plants were the only ones of that introduction that lived to become fully established. There is another grove of this bamboo, at Caspiana, La., not far from Shreveport, also started many years ago, by a Mr. Hutchinson. In 1929, when I first learned of the existence of this grove, it was stated by his son, Mr. C. C. Hutchinson, that the original "root" had been put out by his father about 35 years before. This would have been about 1894. Mr. C. C. Hutchinson, Jr., of Shreveport, La., writes that present members of the family have no knowledge of the source of the original root but that from his early recollection of the grove he believes that the approximation of the year of planting given earlier by his father was about correct. Plants of the 1904 importation mentioned above were sent to Mr. J. F. Shoemaker, Crowley, La., in 1905 and there is a report that a grove developed from these and thrived for a number of years. No relation between these plants and the one that Mr. Hutchinson planted at Caspiana is yet known but unless a connection can be established the origin of the Hutchinson plant is likely to remain a mystery.

If we did not have other basis for a common name for *P. nigra* var. *henonis*, I suppose we should have endeavored more seriously to adopt the name Hachiku into general use in the Western World, but the form and pronunciation of this name are so strange to the eye and ear of persons not familiar with Japanese names that it has seemed better to use the name of the man who earlier had introduced it into Europe, — even though persons unfamiliar with French pronunciation may also stumble over it! It might be



Phyllostachys nigra var. *henonis*, a giant hardy Chinese and Japanese bamboo with slightly fragrant edible shoots. Tallest culms here are 45 feet high, but elsewhere they have exceeded 50 feet. At U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga.



Phyllostachys edulis, the Moso bamboo, most important of the edible bamboos of China and Japan. Tallest culms here are about 40 feet but heights exceeding 70 feet for this species are known. At electric power house, Anderson, S. Car.

justifiable in ordinary horticultural usage to shorten the present scientific name to *P. henonis*, the name by which the plant was known in Europe before its relationship with *P. nigra* (Lodd.) Munro was recognized. There would be no ambiguity in the shortened name, and there would be the precedents established by nurserymen with numerous other plants of often omitting the specific name and using a varietal name in its place. A brief account of the circumstances under which *P. nigra* var. *henonis* came to be called a variety of *P. nigra* instead of the reverse of this, was given in the discussion of *P. nigra* (in the October issue). Syno-

nymy besides *P. henonis* are *Bambusa puberula*, *Phyllostachys faurieri*, *P. puberula*, and *P. nigra* var. *puberula*.

P. edulis (Carr.) Houzeau de Lehaie, the Moso bamboo, is shown in two photographs, on pages 54 and 55, the former giving a general view of a grove in the city of Anderson, S. Car., and the latter a close view in another grove of the lower sections of some new and older culms of this handsome giant species. The whitish surface of the internodes of many of the culms in the foreground—culms of the current year—is due to a very short-velvety silvery pubescence that is characteristic of the new culms of *P. edulis*



View in grove of Phyllostachys edulis in City Cemetery, Anderson, South Carolina, with several new culms (whitish surface) in foreground. (Francis R. Fant, of Anderson, in center.)

for a period after the sheaths fall. As this gradually disappears the surface appearance of the internodes becomes green, except for the conspicuous whitish waxy ring just below each node. The original plant, from the propagation of which the grove in the first picture grew, was obtained from a San

Francisco dealer by the late Rufus Fant of Anderson about 1893, although the grove shown in the general view is understood not to have been started until around 1916. This species is native to China, though now and for many years extensively cultivated in Japan and also to some extent near

Batum, Transcaucasia, U.S.S.R. The culm sheaths, which are blackish brown and densely pubescent, are highly distinctive and are serviceable for identification. Although culms of the Moso bamboo are not known to have attained heights greater than about 70 feet in this country, they have been reported to reach 80 and 90 feet or more in China. The diameters are larger for the height than in any of the other giant species. But the leaves are the smallest — seldom longer than $2\frac{3}{4}$ inches or much wider than $\frac{1}{4}$ inch on mature culms. The foliage presents an exceptionally beautiful feathery effect.

The new shoots of *P. edulis* appear earlier in the spring than do those of other species, with few exceptions. Partly for this reason, no doubt, but probably more because of the excellent quality of the shoots and the large diameters to which they often grow, this bamboo is very highly esteemed in parts of China in which it will thrive. It is understood to be commonly known as Mau chuk in Kwangtung Province, and in Chekiang (at Tang-si), by the variant name Mao tsoh. In Japan, where it is reported by Dr. T. Nakai to have been introduced about 1736, it is very generally called Mosochiku; "chiku" is one of two Japanese words meaning bamboo, the other being "dake," or its equivalent, "take."

Moso, the distinctive part of the Japanese common name for *P. edulis*, is said to be the name of a highly honorable legendary character and to have been applied to this bamboo to indicate the great esteem in which it is held. "Moso bamboo" has already been adopted by Standardized Plant Names as the English common name for this species and I believe it is more suitable, all things considered, than any other that might be chosen. Some years ago the name "giant hairy-sheath edible bamboo" was proposed, but al-

though it is descriptive it is too cumbersome. Moso is short and easy to pronounce and, as already indicated, is well established in a country—Japan—in which the species has become economically important. An entire book in Japanese, detailing different methods of propagation and culture, was published about 15 years ago. I hope that a translation, condensed, may sometime be published, as it should be helpful to the very few present growers in the United States and stimulate interest among other farmers and large-scale gardeners. At present the problem of the commercial propagation of this bamboo remains largely unsolved. I know of only about eight groves of it in the country and four of these are in and near Anderson, S. Carolina. The other four are at Avery Island and Abbeville, La., and the U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga.

The Moso bamboo grove at Abbeville, La., was started in 1905 by the late Dr. C. J. Edwards, with plants introduced the preceding year by the Department of Agriculture under arrangements made by Dr. David Fairchild, agricultural explorer. Plants of this importation placed with several other experimenters all failed. The Avery Island plantings were started by Mr. E. A. McIlhenny in 1910 from plants of another importation (1909) by the Department. These plants were the only ones of this introduction that survived. The Department's grove near Savannah was started from rhizomes obtained in 1926 by Mr. D. A. Bisset, in charge of the Savannah Garden, through the courtesy of Mr. Rufus Fant, from a grove in the city cemetery of Anderson. This latter grove, incidentally, was started about 1911.

No detailed reports on the condition of the several groves at Anderson have been obtained for a number of years.



D. A. Bisset

Phyllostachys vivax, an exceptionally vigorous giant hardy bamboo from Chekiang Province, China, at U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga. In this grove the tallest culms are 45 feet high but elsewhere heights up to 70 feet have been recorded.

but at least until a great freeze killed all the culms to the ground some years ago, the grove in the city cemetery was the most advanced in size of culms. I estimated some to be 48 feet high, with diameters of about $4\frac{3}{4}$ inches, in 1929. In 1942 a short basal section of an old culm at Anderson that had been frozen, measuring nearly 7 inches across at about 3 inches above the ground level, was brought to me. The diameter at a foot higher probably would be $6\frac{1}{2}$ inches. The height of such a culm probably would be at least 65 or 70 feet.

The large mature culms of the Moso bamboo, although not of nearly as high value for most industrial purposes as are those of certain other species, are produced and variously utilized in immense numbers in Japan. They are used as floats for giant fish nets, one of which nets may require a thousand culms. In China, paper pulp is made from the culms of this species. It seems to be generally conceded in Japan that commercial culture in order to be really successful must take into account both the young shoots for food and the mature culms for industrial uses. The commercial production in the late 1920's was reported to be around 110,000 pounds annually. In recent years extensive dying of the very young shoots of this bamboo in one or two situations in the United States has occurred, and the questions of cause and remedy are now under study by specialists. *P. edulis* (Carr.) Houzeau de Lehaie is known also as *P. pubescens* Mazel ex Houzeau de Lehaie, and there are some reasons to support the use of this latter name. The question hinges on whether the plant described by E. A. Carrière in 1866 was in fact the same as the one under consideration here, and I have believed that it was (see Journ. Wash. Acad. Sci. 27: 347-349. 1937). The invalid name "*P. mitis*"

was for a time applied to *P. edulis* through misidentification.

P. vivax McClure, shown on page 57, is a very vigorous giant bamboo from China that has recently produced culms up to 70 feet high at Mr. E. A. McIlhenny's place at Avery Island, La. The specific name, *vivax*, was given in allusion to the rapidity of development of new plantings under favorable conditions. In the lighter soils at the U. S. Barbour Lathrop Plant Introduction Garden, 45 feet is the greatest height reached as yet, though taller culms there are to be expected in the coming years. This species, only recently described and named (Wash. Acad. Sci. 35: 292-293. Sept. 15, 1945) is another one of the Frank N. Meyer introductions from Chekiang Province for the Department of Agriculture, in 1908, for which the detailed record is not quite clear. It now appears likely that it is one of the two very similar giant species collected near Tangsi, both of which were called Tae tsoh. The other almost certainly was *P. bambusoides* (to be treated next). One of these, the larger of the two—said to be the "second in size of the timber bamboos"—was reported by Mr. Meyer to grow in the valleys and at the foot of mountains, while the other, apparently only a little smaller as observed, grew on level land and in a more open stand. This latter apparent characteristic could be the result of thinning, I believe. This second species was said to be called also Kang tsoh. It is not possible at present to say which of these two bamboos, if either, *P. vivax* may represent, but the evidence seems strongly to indicate that it was one, and that *P. bambusoides*—collected at the same time but which did not survive—was the other.

Plants of this bamboo were placed with Mr. McIlhenny several years after the introduction was made and these



P. H. Dorsett

Phyllostachys bambusoides, the well-known hardy giant timber bamboo of which there are several mature groves in the mild-wintered parts of the United States. This is a view of the main grove at the U. S. Barbour Lathrop Plant Introduction Garden, about 12 miles southwest of Savannah, Ga., on the coastal highway, taken in 1921. Culms up to 72 feet have been produced here.

were the only ones of this species that survived. Happening to be planted in an unfavorable situation, it was many years before the species gave noticeable indication of its possibilities. It is closely allied to *P. bambusoides* and some of us held the view for some time that it probably was just a distinct variety of that species. Mr. McIlhenny's careful observations over a long period, however, convinced him that it was a quite different bamboo, and when a critical study of adequate vegetative specimen material was made by Dr. F. A. McClure, Mr. McIlhenny's judgment was fully confirmed.

The leaves of *P. vivax* are at first in 3's and 4's but the lower one drops late in the season, leaving 2 or 3. They are fairly broad for their length— $2\frac{1}{2}$ - $6\frac{1}{2}$ inches long by $\frac{1}{2}$ - $\frac{7}{8}$ inch wide—and are flat as contrasted with the slightly wavy leaves of *P. bambusoides*. The culm sheaths greatly resemble those of *P. bambusoides*, being darkish and fairly well covered with large spots, often ill defined, or diffuse, but they differ in the conspicuously crinkled condition of the sheath blade. Among less noticeable characters, the sheaths differ in the entire absence of any pubescence or marginal cilia. This completely glabrous character suggests the English common name "smooth-sheath bamboo," which I here propose. The smoothsheath bamboo, because of its large size and of its even greater vigor as compared with *P. bambusoides*, seems destined probably to become of first importance among the hardy giant timber bamboos. It is possible, however, that the tests of the physical properties of the wood that are in progress may compel some revision of this opinion. The young shoots are edible. *P. vivax* has been sent out by the Department of Agriculture in recent years as *Phyllostachys* sp., P. I. No. 82047.

P. bambusoides Sieb. & Zucc., a view of a grove of which is shown on page 59, is the most widely known and cultivated of the hardy giant bamboos in our southern and Pacific Coast states. It is a Chinese species but has been grown widely also in Japan for a very long time, and the early introductions of it into the United States, as well as into Europe, apparently all were from Japanese sources. The commonest Japanese name is Madake. In the United States the species has been called the "hardy giant timber bamboo," "giant timber bamboo," or simply "timber bamboo" for brevity. It has also been called "Japanese timber bamboo." With the recent observations concerning the somewhat similar, newly described, *P. vivax*, and, in addition, our knowledge of the large form of *P. sulphurea* var. *viridis*, it begins to seem questionable whether it is advisable to continue the use of such a general name as "giant timber bamboo" to designate any one of the three giant species that so closely resemble one another in a number of characters. All three of the species in question are hardy giant timber bamboos. I incline to the opinion that the short Japanese name, Madake, already widely known for *P. bambusoides*, will hereafter be found the most suitable common name for this species, wherever it may be grown outside of the Orient. The young shoots of Madake are of good quality for eating.

P. bambusoides thus far seems to hold the record for height among the hardy bamboos by a narrow margin, in this country, according to the present available information. It remains to be seen whether it will continue to hold it against *P. vivax*. A 1945 culm at the Barbour Lathrop Plant Introduction Garden grew 72 feet high. The diameter of such a culm is nearly $5\frac{1}{2}$ inches at a foot from the ground. Data



P. H. Dorsett

Basal sections of large culms of *Phyllostachys bambusoides*, showing masses of the true roots. A section of rhizome from a bud of which the culm at the left originated and to which it is still attached is clearly seen. As is also evident, the culm section at the right is split to show the internal structure, including the diaphragms at the nodes.

for comparison of the physical properties of the wood with those of the other two species alluded to above are not available as yet and it cannot be stated with any certainty, therefore, whether there are significant and important differences. It seems probable, however, in the light of past experience with *P. bambusoides* that its wood will not prove inferior in qualities that determine industrial value. The surmace of the internodes is of a beautiful glossy green, which becomes gradually duller and finally, after several years, grayish or yellowish green.

The leaves of *P. bambusoides* are usually 4 - 5 on a twig, one leaf falling late in the season, and are somewhat wavy. They differ in this respect from those of *P. vivax*, as well as from those of most other related species. In size of leaf there is little difference between these two species, though in some situations the leaves of *P. bambusoides* have seemed to average slightly broader for their length than those of *P. vivax*. The range in length of the mature leaves is from $2\frac{1}{2}$ to about $6\frac{1}{2}$ inches and in width from $\frac{1}{2}$ to $\frac{3}{4}$ inch or rarely 1 inch. The culm sheaths, like those of many other species, are variable in their markings, as well as in the shade of the ground color in the fresh state. In general the ground color on the lower sheaths is a dingy straw color, the higher sheaths gradually becoming a normal straw color, and the markings consist mostly of ill-defined and odd-shaped brownish spots and blotches, the blotches often predominating. There are usually no auricles and no bristles present on the lowest 6 or 7 sheaths on the culm but they develop conspicuously on the sheaths from about the 8th node upward. There are only a few scattered fine hairs on the surface of the sheath but the outer margin is distinctly ciliate.

There are several vernacular names besides Madake, as for example, Nigatake, reported from Japan for *P. bambusoides*, but it seems scarcely worth while to give others here. Two other scientific names that have been current for it in the past are *P. quilioi* and *P. reticulata*. The former is a straight synonym, but Dr. McClure has told me that he has such serious doubts that *Bambusa reticulata*, on which *P. reticulata* was based, was the plant we now know as *P. bambusoides* that on the basis of present evidence he is not willing to concede the identity of the two. (He has examined the type specimen of *B. reticulata*.)

Before leaving the genus *Phyllostachys*, I think it is worth while to try to give the reader a little better idea, by means of a photograph, of the rhizome and root systems of the bamboos of this group, and an informative photograph taken many years ago by the late P. Howard Dorsett, with whom I had the pleasure of working for many years, is shown on another page. Also, as it is difficult to envision from words the magnificence of one of the larger bamboo culms as it stands in nature, a photograph taken a few years ago by Mr. John E. Cornwell, Allerton Farm, West Chester, Pa., looking directly upward from the base of one of these great culms of *P. bambusoides*, is reproduced, on page 63.

And finally, in order to give a visual impression of the edible bamboo shoot, there is included a photograph showing an entire shoot of *P. bambusoides* as it appears when dug from the ground, together with another shoot with sheaths and woody base removed, and parts of other shoots variously cut and in different stages of preparation for cooking. The texture of a proper shoot for eating is firm and crisp except that toward the base of the shoot the fibers which ultimately form wood



John E. Cornwell

"Looking upward" from base of a giant culm of *Phyllostachys bambusoides*, at U. S. Plant Introduction Garden, near Savannah, Ga.



R. L. Taylor

An entire edible shoot, with enclosing sheaths, of Phyllostachys bambusoides, with other shoots "peeled" and in various stages of being cut up for cooking—in differently shaped pieces.

are gradually further developed in that direction and the lowest part of the shoot is too woody to use. By cutting the moderately fibrous portion crosswise and not too thickly, so that the fibers are all cut into short lengths, and then cutting the slices further into other desired sizes and shapes, more of the fibrous portion of the shoots can be used with satisfaction in eating than if the pieces are cut lengthwise of the shoot. The shoots retain the crisp texture, even in the tenderest portions, when cooked. The shoots of most species of *Phyllostachys* other than *P. dulcis* have a more or less bitter taste when fresh, and it probably is best as a rule to parboil them for 6 to 8 minutes and then change the water. One change of water usually is sufficient, with a total cooking time of about 25 minutes. The taste or flavor can perhaps best be described by saying that it slightly resembles very young field corn; as one writer has suggested. Some earlier writers have compared edible bamboo

shoots to asparagus, for which there is not the slightest basis except that both products are cut when very young. The cooked shoots are satisfactorily served hot with butter and in meat stews, cold as a salad or in mixed salads, and in numerous other American, as well as oriental, dishes.

Correction

Attention is called to a correction made in the reprint of the first article in this series. On page 185, in the July, 1945, issue of the magazine, the name *Sasa palmata* (Mitt.) E. G. Camus was used tentatively. Too late for correction in the magazine, the conclusion was reached that the name would be written more correctly *S. palmata* [Burb.] E. G. Camus. The name *palmata* was first used for the plant by F. W. Burbidge, not by A. B. Freeman-Mitford as indicated by Camus in his publication of the new combination.

Rock Garden Notes

ROBERT C. MONCURE, *Editor*

Some Dependable Plants for the Rock Garden

A well planned and planted rock garden or wall planting is a real achievement. It may be a thing of beauty, or if not given due thought it will develop into a mass of rocks, scantily covered with a few plants none of which will be growing well.

One may, however, with a little study of proper placement of the rocks with soil well rammed in between and around them, with interest in good plant material, with some perseverance in upkeep, possess the most worth while and valuable part of the ground surrounding a home, for a choice rock garden is a never failing source of pleasure.

A basic rule is to select plants for their foliage effect as well as charm of bloom, for there are times when all plants have a rest period. When they are out of bloom, however, if right choices are made the rock garden will present a good appearance throughout the entire season because the rocks are adorned with the foliage of interesting patterns and attractive green.

If one plans with this in mind, one soon learns that not all alpine are desirable. One needs to exercise a calm judgment as to what is most beautiful, most dependable for the places in which they are destined to find their new home.

We do not want the rock garden to present the garish color display the herbaceous border renders, rather we should strive for fine and delicate detail, remembering always that these are precious gems and should be planted

with a sense of fitness of material to the place in which it is to grow.

Too many rock gardens have a spotty appearance, due to the fact that the owner chooses too many varieties, often only one of a kind; thus we find no unity in design, just a heterogeneous collection. It is the nice balance of foliage and flower—plants of special interest and charm that repay dividends of satisfaction and the picture made is a real achievement.

Everyone ought to develop an interest in the native habitat of alpine plants. If one learns how and where they grow and gains some understanding of their simple likes and dislikes, he may more intelligently provide for them suitable places and conditions for healthy growth.

Undoubtedly two main points of alpine culture are *drainage* and *top-dressing*, and success depends on our attention to these.

Let us begin with the lovely *Aethionema*, not because they begin with the first letter in the alphabet, but because this genus of delightful plants present charming subjects for the rock garden. Their native home is on sun-baked soil therefore give them a sunny spot and since they are deep rooting, gritty limestone soil is to their liking. *Aethionema grandiflorum* grows about a foot high, is dependable, the pink blossoms are effective, and it can be used on the higher places to advantage. Lovelier still are the dwarfer ones—*armenum* and Warley Hybrids. These are more compact in their habit of growth, their neat small bushlets never more than four inches in height and each stem will carry a rounded head of pinky-

mauve flowers. Warley Hybrid is very like *armenum*. They are lovelier when grown in groups of three, and may be depended upon to bloom wonderfully well.

Epimediums are invaluable for shady corners of the rock garden, but will do fairly well in part sun. The flowers are daintily charming—myriads of tiny blossoms white and cream—sulphur yellow and some with various tones of lavender. But Epimediums are especially valuable because of the beauty of their foliage. The heart-shaped leaflets have lovely tints in early spring, light green during summer and again in autumn carry bronze tones. The plants grow to twelve inches in height and are always a delight to see, because of the character of their growth. The leaves are classic in design, are carried on slender stems, but stand upright in wind or storm. This is highly recommended for the choice rock garden, but strange to say is not often seen even among so-called good collections. Epimediums seldom set seed but may be propagated by division. In the writer's garden, the Epimedium planting draws appreciation from every visitor.

Erodium or Heron's Bill is closely related to the Geranium family, and is a valuable plant both for foliage and charm of bloom. They are grouped in several classes—some with silky foliage—some with leaves never silky—those wrapped with hoary green down—then those so-called hybrids.

Observing many plantings in England, the writer became an enthusiast, brought home seeds and from these a goodly batch grew and bloomed wonderfully. Many were lost, due to lack of perfect drainage, a lesson we all must learn if success is our aim. The Erodiums are so fairy-like in their character, that one is doubly repaid in any effort to grow them well, if one meets

with failure it is worth trying again, for they are easily raised from seed. *Erodium macradenum* has delicate green fern-like foliage with pink flowers with a spot of black at the base of the petals; it is unusual and intriguing. *Erodium corsicum* is just as lovely but since it comes from Corsica it needs some protection in winter. *E. guttatum* has white flowers and is a good little plant. *E. chrysanthum* is yellow flowered; thus this genus gives us a variation in color of flower. Give them a choice place, indeed a conspicuous spot for they have a long season of bloom, are only three to five inches high, and when out of bloom have foliage of interest and beauty. To see how far down among the rocks their roots will travel, shows us how very much they require drainage, for they will not stay with us long without it.

If we are charmed with Erodiums, then their cousins the Geraniums or Crane's Bill will prove equally intriguing, for the dwarf geraniums are considered by many to be the most charming of all rock plants, for they are exquisite in bloom and quite amenable to easy culture.

It is difficult to say which is best among the three choice varieties—*argenteum*, *cinereum*, *Lancastriense*.

Argenteum is called the silver-leaved Crane's Bill and since any glaucous green foliage always lends distinction to any plant, it gives this special charm and with its three inch high, saucer shaped pink blossoms with darker veins it is indescribably beautiful. *Cinereum* is much like *argenteum*, not quite as hoary and with flowers a little lighter in color.

Lancastriense is very choice, It is of prostrate growth; its branching stems close to the ground, carry many large saucer shaped flowers of a clear salmon pink delicately veined. To see it growing out of the rocks is a sight



Claude Hope

Autumn Blooming Cyclamen

[See page 70]

not soon forgotten. It presents a charm unbelievable. These present a real picture when planted in groups of three. Few plants of whatever genus can surpass these dwarf Geraniums in beauty and desirability.

The genus *Campanula* is known and grown by almost every owner of a rock garden, and rightly so since this family contains so many desirable and satisfying types of plant material. They might well be used as the main part of the picture, using other plants as accents. They are very amenable to good soil and reasonable care; there is enchantment about their bloom and foliage that make them really indispensable in any good rock garden.

First choice might be given to *C. muralis* or *portenschlageana*, considered by many to be the finest of all rock garden campanulas. Easily grown, its glossy green foliage a joy always, and in bloom its violet cups grow in such profusion as to almost hide the foliage, and after blooming time is over its neat cushions of leaves is pleasing all through the summer indeed, into winter. One could be quite content with this enchanting charmer if no other alpine campanula existed, but there are many others to satisfy the desire for variety.

Campanula rotundifolia is the good and dependable Bluebell of Scotch ancestry, which should be in every rock garden for its dependability of bloom and growth. There is considerable variation therefore one should be watchful for good forms.

Purple Gem is one of the new hybrids of deep rich color and exceedingly prodigal of bloom, much more so than the ordinary form.

Campanula stenocodon is quite rare, said to be a hybrid of *rotundifolia*, but it bears no resemblance to the latter, for *stenocodon* has tube shaped narrow bells of violet, frail in its manner of

growth and just six inches in height. It is a lovely thing and any one having even one plant ought to feel a thrill. Mine bloomed wonderfully, and visitors came to see it, but it passed out probably due to too rich soil. These denizens of the mountains cannot thrive on rich food. Having learned that it likes stony places in which to run its roots, my next try ought to result in success.

Campanula poscharskyana is a likeable plant, has the reputation of being somewhat invasive or rampant, but it is so easily lifted by sections and planted in another spot which needs its showy lavender blue star like blossoms, myriads of them like a blue fountain.

Garganica is another easy doer. It is charming as it fills every crevice and will follow the contour of the rocks in a most interesting pattern, always neat and compact. Surely its color has been taken from the fair Italian skies. It is a sun lover and is easily increased by division.

Carpatica is always a welcome friend when Spring calls forth its sleeping beauties. Isabel is one of the newer forms and Blue Carpet is but recently come out. Harvest Moon carries large flowers very flat, almost wheel-shaped and of fine color. *Carpatica pallida* gives us blooms of large size and light blue.

Slugs cause many casualties among Campanulas, indeed in one night a favorite plant may be destroyed. From an English gardener comes this advice: "Make a solution of Potassium Permanganate using one teaspoonful of crystals to one and one-half gallons of water. Water the surface around the plant with this solution letting it soak into the soil, this kills the slugs in the ground." Collars of wire or any rough materials help greatly in warding off these pests, but the Permanganate solution would simplify matters because



Malby

Campanula muralis

of its outright kill and the report states that the young shoots looked particularly healthy after the application, thus it is worthy of a trial.

Those who study and observe good plant material, soon develop a great appreciation for those creeping and trailing things which prove invaluable in clothing the rocks with their verdant carpets, among these we find Veronicas, Thymes, Dryas.

Of the Veronicas, we might well choose *V. rupestris* as the best. It is a very prostrate trailer, will cover a huge rock and creep down its side with the neatest and loveliest of dark green foliage, and in bloom is covered with tiny spires of rich blue blossoms, presenting a fascinating picture in May and June. Its foliage is as freshly green in summer and autumn as it is when it first awakens in spring. Nothing can be lovelier than this, and a rock or wall curtained with this blue charmer is a thrilling sight.

Veronica teucrium trehani is also desirable—having small yellow green leaves and fascinating amethyst blue spires.

Thymus Serpyllum has many hybrids of great value. *Coccineum* has minute leaves of very dark green forming a mat-like effect with the tiniest petals of intense crimson blossoms. This is certainly a choice and desirable creeper, it will not grow, however, as fast or cover as much surface as does *Serpyllum* or of *citridorus*. The latter, however, has value with its close mat of foliage and just to brush it in passing one enjoys the delightful lemon odor.

Lanuginosus is a dense fragrant carpeter, with its tiny glaucous green leaves that seem to be cut out of velvet. This should be planted close to the edge of a rock so that as it grows it may have the dry and cool surface whereon it may be assured against dampness, for like all hairy or velvet

textured foliage they abhor dampness. All the Thymes delight in a sunny spot.

The Dryas (mountain avens) is not a large family. We have, however, two worthwhile varieties, namely *octopetala* and *Sundermanii*. *Octopetala* is neat and lovely, the leaves are small and dark green somewhat like tiny oak leaves. The flowers are wide open saucers of white with golden centers, carried singly on stems about four inches high. If happy it will spread over a foot or more across. The blossoms are followed by fluffy heads of seeds like *Anemone alpina*.

Sundermanii is a hybrid of *octopetala* with the same dense and dwarf foliage. It is easier to grow than the former and more charming since its blossoms are larger and creamy white. It is a plant of compelling charm. This family requires gritty soil and a well drained site. Large plants do not transplant easily, so thrifty young plants are best.

It is possible to have a bit of fairyland in the rock garden if the Alpine Cyclamen is given a choice place in semi-shade and well drained. We might well call it the food of the gods even as it was in early times referred to as the Bread of Sows. The family is not

large—the named varieties being quite similar in growth and bloom. They are so fairy-like they seem unreal. *Cyclamen europæum* is wonderfully charming, flowering in late summer and the bright pink flowers have a delightful scent.

Cyclamen neapolitanum comes to bloom in early September before the leaves appear. The flowers on three-inch stems are an exact counterpart of the large greenhouse type, except these are miniature. The delicate blossoms of orchid tint has a spot of crimson at the base of each segment. The leaves are ivy shaped are somewhat variable in size, are pointed and the fine green beautifully marbled. They may be depended upon to bloom freely when well established. The seed capsules are almost as intriguing as is the bloom, for these curl up like a tight cork-screw and when fully matured suddenly burst scattering seed. It is a slow process to grow Cyclamen from seed, so one is wise to start with good corms which are available from firms specializing in unusual seeds and bulbs.

IONE WATERS.

Cincinnati, Ohio.

Lily Notes

GEORGE L. SLATE, *Editor*

Raising Lilies From Seeds

The raising of lilies from seeds is an interesting and fascinating experience and as gardeners generally buy their lily bulbs instead of raising them from seeds, the production of a batch of seedling lilies may be regarded as somewhat of a horticultural achievement. Several advantages may be listed, of which the most important is

the freedom of the seedling plants from the virus troubles to which these beautiful plants are subject. The raiser of seedling lilies can have many lilies for a comparatively small sum if he is willing to devote some time and effort to the project. When seedlings are raised there is an opportunity to select only the best for the border, the poorer plants being discarded. The

variation in a colony of seedlings is always an interesting feature when lily growers are viewing the display. As successive generations of seedlings are produced in the environment of one's garden, it is reasonable to expect that there may be a gradual adaptation of the species to garden conditions, and possibly an elimination of plants inheriting susceptibility to some of the ailments of lilies.

The raising of lilies is not difficult, but does require considerable patience as the seedlings grow slowly and none bloom earlier than the second season when grown in the cold frame, while some of the slower species may not bloom until the fourth or fifth season after the seed is sown. When they are grown in cold frames under lath shades, the amount of care required each day is very little.

To raise lilies from seeds one must first obtain the seeds. Except for *Lilium regale*, *L. pumilum*, and *L. formosanum* lily seeds are not generally offered by seedhouses. A few lily specialists can supply additional species, but considerable searching and correspondence may be necessary before seeds of the rarer lilies can be obtained. In some cases it may be necessary to purchase bulbs and raise one's own seeds.

If the seed crop is to be produced at home the necessary pollination must not be left to chance, but should be done by hand. Lilies frequently fail to set seeds when self-pollinated. If these self-unfruitful plants are to produce seeds they must be pollinated with pollen from another clone of the same species. With lilies that are generally grown from seeds, every plant in a population is different and its pollen should cause seeds to set on other plants of the same species. Vegetatively propagated lilies, however, may all be of the same clone and the transfer

of pollen from one plant to another within the clone will not produce a seed crop. The Madonna lily rarely seeds in gardens since all plants are of the same clone. However, if one can get pollen from other clumps of this lily, especially from plants that appear different, or that were set many years earlier, or later, than those on which it is desired to produce seeds, these plants may well be of another clone and their pollen should function effectively in producing a seed crop. Pollen of the Salonika variety of *L. candidum* is very effective in producing a seed crop on the ordinary type of *L. candidum*.

The seed capsules of most lily species contain several hundred seeds so that not many capsules are needed to produce enough seeds for the average garden. Heavy seed crops may exhaust the plants and not more than two or three capsules should be allowed to develop on each plant.

The capsules are harvested when they begin to crack open and the seeds are shelled out. The later blooming species may not ripen their seeds before hard frosts, but the stems may be cut and placed in water in a warm place where the seeds will ripen up within a few weeks. When a greenhouse is available, the later lilies which fail to ripen seeds outdoors may be grown in pots inside to insure the ripening of the seeds.

Lilies may be raised from seeds by various methods and the choice of a method depends largely on personal preference and available equipment. A cold frame, lath shades and seed flats are essential but a greenhouse will provide a longer growing season for the seedlings. However, its lack should not deter any from raising seedling lilies.

Lilies may be divided into two groups according to the method of ger-

mination of the seeds. The seeds of the one year lilies germinate promptly the first year, send up a cotyledon, followed by a true leaf and continue growth throughout the season. Lilies germinating in this manner include *amabile*, *callosum*, *candidum*, *concolor*, *dauricum*, *Davidi*, *formosanum*, *Henryi*, *Leichtlinii* var. *Maximowiczii*, *longiflorum*, *regale*, *Sargentiae* and a few others.

The two year lilies also germinate the first year and make a tiny bulb which sends up no leaves the first year, but remains dormant until a year later when leaves appear. The tiny bulb requires a period of relatively low temperature to break the dormancy of the shoot and permit leaf growth. Normally this is brought about by leaving the seed flats outdoors over winter. Thus seeds planted in the spring of one year are left in the cold frame over winter and begin leaf growth the second spring. Where the winters are short and mild, lily seeds planted in the fall may germinate while the weather is still warm and later be subjected to enough cold to break the dormancy of the shoot, in which event they will make leaf growth the spring after fall planting. The winters in New York state are too long and cold for this to happen, so that fall planting of the two year lilies is not an advantage.

The two year lilies include the following: *auratum*, *canadense*, *chalcidonicum*, *Humboldtii*, *japonicum*, *Martagon*, *pyrenaicum*, *speciosum*, *superbum* and others.

The seeds of the first year lilies are planted in seed flats in the cold frame in early spring. Early planting is advisable as the seeds of some lily species, especially *L. candidum* and *L. Henryi*, germinate better at low temperatures. If convenient the seeds may be planted in late fall or during the

winter and the flats left in the cold frame.

The critical period with these lilies is from the time the cotyledons appear until the first true leaf is nicely started. During this period damping off may take place in rainy or cloudy weather or if the flats are watered too freely. The flats should be kept on the dry side and in wet weather the shades should be removed to promote aeration and drying of the soil surface. The use of finely pulverized sphagnum instead of soil for covering the seeds will tend to eliminate much of the damping off.

Watering should be done as needed and in the morning so that the foliage and surface of the soil will be dry before night. Weeds should be removed when small to prevent disturbing the lily seedlings.

The two year lilies are handled somewhat differently. Since they make no leaf growth the first year the seed flats are stacked up. The seeds germinate and form bulblets and these remain dormant throughout the first summer. The weed seeds germinate but in die the darkness. About every three or four weeks the flats are taken down, watered and stacked again. In the late fall the flats are moved out to the cold frame. The following spring leaf growth appears and the care thereafter is the same as for the one year lilies. With this method the flats are carried through the first season with a minimum amount of care and they occupy no space in the cold frame.

Regular and thorough spraying with Bordeaux mixture 4-2-50 is advisable to control botrytis blight which in wet cloudy weather may often defoliate the young plants and severely check their growth. On the average the spray should be applied every two weeks, but in a dry season the intervals between

sprays may be lengthened. In wet cloudy weather weekly sprays may be necessary especially early in the season, and the shades should also be removed to permit aeration and more rapid drying of the foliage.

Another worthwhile practice is fertilizing the seed flats at intervals of a week or ten days during the growing season with chemical fertilizer dissolved in water. Plants receiving this stimulation grow much faster than unfertilized seedlings and may even bloom the second season if left in the seed flat. The fertilizer solution is prepared by dissolving a handful of a 5-10-5 fertilizer and a handful of sulphate of ammonia in three gallons of water. Each flat received about a pint or less of the solution and is then sprinkled with water to wash the solution from the foliage.

Seedlings of the one year lilies remain in the flat for two years while the two year lilies stay three or even four years with some of the slower growing species. Each winter the flats should be mulched to prevent frost action from heaving the little seedlings out of the soil. Covering the flats with fine mesh hardware cloth will keep them out.

When the seedlings are ready for removal to the nursery beds the soil is tipped out of the flats the bulbs picked out of the soil and planted out in rows. A planting depth of two to four inches and the bulbs six inches or less apart in rows eight to ten inches apart will give them enough room for the time they are to spend in the nursery. Mulching is advisable for

the first winter. Straw, marsh hay, or a similar material may be used where snow cover is uncertain. Evergreen branches may be used too for protection.

The seedlings will mostly bloom the second year in the nursery at which time the best may be selected for the garden. Vigor of plant and placement of flowers are important garden characteristics to consider in making selections. The two best plants may be crossed with each other to provide seeds for another lot of seedlings.

Seedling lilies may be raised by many other methods. The use of a greenhouse provides a longer growing season and consequently a larger bulb in a shorter time. The seedlings too may be pricked out into two inch pots where they may make better growth than when crowded in the flat.

The seeds may be planted directly in the soil of the cold frame instead of in flats. If the soil is sterilized with some material such as Larvacide which kills weed seeds as well as fungi, the labor of caring for the seedlings will be reduced to a minimum.

Open field culture is possible, but the watering will need close attention when droughts occur.

If basal rot is discovered on the little bulbs when they are tipped out of the flats they should be washed, the rotten tissue scraped out and the bulbs dusted with Arasan or Spergon. The *Martagons*, *candidum* and *chalcedonicum* are most likely to show basal rot.

GEORGE L. SLATE

Geneva, N. Y.

Rhododendron Notes

CLEMENT GRAY BOWERS, *Editor*

Dexter's Hybrid Rhododendrons

It is important that something be placed on record regarding a hybrid race of rhododendrons belonging to the Fortunei Series, raised and disseminated during the last twenty years by the late Mr. Charles O. Dexter of Sandwich, Mass. While the history and description here presented are not complete and further information will be required to fill all the gaps, the danger is ever present that certain vital facts will be lost or forgotten if such are not assembled while available. Since this group of plants and their progeny will be likely to occupy a permanent position in American horticulture, the subject is significant. At the present time, considerable numbers of Mr. Dexter's own production are in existence, but it is questionable how many of them will ultimately pass from sight, to be replaced, in the Northeast at least, by hardier forms derived from further crossing.

At present we can say only that these beautiful rhododendrons belong largely to the Fortunei Series. It is probable that several species belonging to that Series, plus others from outside, have had a part in their development. These may be *Rhododendron Fortunei*, *R. Griffithianum*, *R. decorum*, *R. discolor*, *R. Fargesii*, *R. calophytum* and possibly others. All of these come from China, or regions nearby. As time goes on, the admixture of other species will grow greater as plant breeders use more species to bring in color, hardiness and other characters. The Dexter plants themselves appear to represent mainly large-flowered species of *Fortunei* character probably crossed *inter*

se, but this is conjectural. Although Mr. Dexter worked outside this group, it is with the race resembling *R. Fortunei* and its close allies that his name will be associated and with which we shall concern ourselves here.

On the whole, these plants may be described as large and vigorous, fully equaling the Catawba and Maximum rhododendrons in height, although none are old enough to really give us these data. When growing vigorously they are tolerably hardy in protected spots as far north as Boston, but are strongly suspected of following the behavior of their progenitors of the Fortunei Series in disliking zero temperatures, and, if growth is slowed through unfavorable conditions or by maturity, they might quickly succumb to winter-killing. It may be too soon to speak with authority on this subject, but one would hesitate to recommend them for any sub-zero climate. But, despite this, they constitute the most important "break" of recent years among ever-green rhododendrons on the Atlantic seaboard.

The Dexter hybrids bloom about one week earlier than *Rhododendron carolinianum*, which ordinarily blooms about May 20th at New York City. Their flowers are very large, some measuring nearly five inches across, and are borne in loose trusses of about ten flowers, which is considerably less per truss than our Catawbas, but the trusses are large, due to flower size. Their shape is rather flaring, some distinctly lily-like, and their edges may be plain, wavy or frilled. Their colors range through light pink shades down to cream and white, the yellowish

creamy character of some being merged with pink and light rose to produce salmon and apricot shades which are very handsome. Although a few may produce bluish or purplish hues, or be tinged with pink or lilac in the bud which later fades to white, they are ordinarily quite free from any purplish or magenta cast. In other words, their colors appear quite clean. Many of them are delightfully fragrant, although this is a variable character and Mr. Dexter once told me that those having the more fragrance proved to be more tender. The quality of their fragrance varies somewhat, too. In a more delicate way, several have a fragrance resembling a gardenia, while others have the scent of nutmeg. They are reasonably floriferous, but are not so showy as some other sorts because of their delicate colors, and the blooms are very beautiful as individual specimens. A few seedlings have appeared in fairly bright rose color, but brilliancy is lacking and further development toward richer color is needed. At one time Mr. Dexter was enthusiastically concerned with crosses of "Brittania," a brilliant English hybrid, on his plants No. 8 and No. 9, and it is possible that the stronger of his colors came from this source. The flowers are generally without conspicuous dots or color patterns on the upper lobe, but are otherwise marked, frequently having blotches of dark rose in the throat and along the ribs of the corolla lobes, sometimes intermixed with definite yellowish tinges.

The charm of the Dexter hybrids lies in the color, size and fragrance of the individual flowers, of which too much in praise can not be said, but the plants as a whole are looser, less formal and more untidy in appearance than those of *Rhododendron catawbiense*. The leaves may be a bit larger and a shade lighter in color than those of the latter.

The flower trusses are apt to be flat-topped, although several have well-formed spherical trusses, but with less than half the number of flowers per truss that are found in typical Catawba or Maximum rhododendrons.

Seedling plants, produced by Mr. Dexter, are now growing at several places along the Atlantic coast and in the Pacific Northwest. One collection is at the New York Botanical Garden, others at the Arnold Arboretum and around Boston, while Mr. Samuel A. Everitt of Huntington, Long Island, has several hundred of Mr. Dexter's original seedlings under conditions almost approximateing those on Cape Cod where the Dexter collection resides. I understand that a considerable quantity of Dexter seedlings are also in the University of Washington Arboretum at Seattle, Wash., while others exist elsewhere. Since they seem to be fairly typical, the data for this paper are taken from the plans in Mr. Everitt's collection.

The main origin of the Dexter hybrids starts certainly with a few plants acquired early in the 1920s, or thereabouts, from the one-time Cape Cod nursery of the R. & J. Farquhar Company, located at Osterville, Mass., a short distance from Mr. Dexter's home. When this nursery was discontinued, Mr. Dexter bought these rhododendron plants which came to him without name or record of origin. All appeared, however, to belong to the Fortunei Series. It is said that the late E. H. Wilson gave it as his opinion that one of them resembled *R. Griffithianum*. Whether any were named English hybrids, unknown in America, or merely chance seedlings remains to be determined and I am not competent to pass upon it.

Whatever the origin of these first plants, their number was soon augmented by seedlings which Mr. Dexter raised from them and to which he gave

pedigree numbers. It is thought that these first were from crosses made *inter se* among the originals. Now, it so happened that Mr. Dexter acquired unusual skill as a propagator of seedlings and was soon raising them by hundreds and thousands. Assisted by an unusually favorable climate, site and soil, plus an ingenious mind in devising new techniques, plus the ability to nurse young plants with complete sympathy and diligence, Mr. Dexter, by 1926, was growing rhododendrons with about twice the speed of any other grower along the Atlantic seaboard. This encouraged him to get seeds of exotic species from China and England, raise many of these to blooming size and use them in further crosses. As might be expected from seeds gathered among mixed collections, where bees transfer pollens promiscuously, the seeds Mr. Dexter acquired and raised were probably, in some cases at least, untrue to type. So it is further not certain just what went into the new strain, but we know that he got a great many interesting things.

Mr. Paul Frost, landscape architect, of Cambridge, Mass., had much to do with the ericaceous plants originally used on the Dexter estate, gathering rare sorts from many sources, including some of the Fortunei series which John Farquhar, prior to his death, had brought from England, presumably out of Robert Veitch's nursery at Exeter. It seems that these were the plants growing at Farquhar's Osterville nursery, among which Dr. E. H. Wilson distinguished *R. discolor* and *R. decorum*, which Mr. Dexter acquired and numbered. Mr. Frost recounts that Mr. Dexter wrote, as late as June 19, 1925, that he had ordered from Osterville "14-15 Fortunei" as well as many azaleas, to be delivered the following Autumn. But Mr. Dexter had been collecting with Mr. Frost's aid since

1922, from a dozen different sources, so we cannot be sure that the Farquhar plants were the only ones used as an original basis for his work. This, however, seems most likely, in the opinion of the writer who first visited Dexter's in 1927 and observed in the plants which Mr. Dexter said were of the Farquhar source most of the characteristics of the race as it now exists. In 1926 Mr. Dexter erected a small greenhouse and began hybridizing and propagating seedlings in quantity. Mr. Frost writes:

"By 1928 and 1929, because he very much accelerated the process of production, Mr. Dexter was setting out annually in his Woodland nursery rows ten thousand rhododendrons and azaleas. Wilson shared with him seeds from the Arboretum, to which more and more of his own hybrid crosses were added. . . . After my visit in 1930 to Millais, J. C. Williams and Edinburgh, came the great period of experimentation with scores of Himalayans in New England."

Mr. Frost says that "certainly a score or more" of the Farquhar plants formed the basis of his later hybridizing.

In his crossing, Mr. Dexter chose parent plants with certain ideals in mind, his more important objective being to produce improvements and extensions of the Fortunei Series. It should be noted that species which survived at Mr. Dexter's had previously been tried unsuccessfully at botanical gardens and arboreta throughout the Northeast. In my opinion the success of Mr. Dexter in growing them was due in part to his favorable Cape Cod site plus the vigorous state of growth in which they were kept. They were well fertilized in early spring and no dryness was allowed to check their summer growth. In such vigor they were able to withstand the cold climate

of Boston, although I understand that all are not successful there now. It is to be expected that as such plants grow older and their vigorous vegetative growth diminishes they may not remain so resistant to cold winter temperatures. I choose to be very conservative and assert that the hardiness of any of these Dexter seedlings has not yet been fully proven for sub-zero climates or exposed locations.

I shall describe the Dexter hybrids in discussing the rhododendrons growing in the garden of Mr. S. A. Everitt on Long Island, since the plants which he acquired from Mr. Dexter appear to be fairly typical.

The Everitt Rhododendron Dell

Webster's definition of "dell" is "a small retired valley." This seems to aptly describe the shelterbelt valley or ravine owned by M. Samuel A. Everitt on Long Island. This semi-wooded vale leads down to Huntington Bay and lies within a few hundred yards of salt water. The surrounding slopes, with their cover of tree-growth, mostly oak, protect the plants in the valley from all sweeping winds and furnish conditions of light semi-shade and considerable atmospheric moisture. Although the soil is somewhat light, favoring good drainage, the situation is neither exposed nor dry, and the proximity of a body of water tends to equalize temperatures in both summer and winter favoring freedom from extremes. In these respects, Mr. Everitt's garden resembles that of Mr. Dexter on Cape Cod, where similar conditions prevailed and where winter temperatures seldom went down to zero. Similar, too, is the plant sympathy displayed by the owners, who treated their plants to a perpetual mulch and adequate feeding. Obviously, these conditions are as good for growing rhododendrons as can be found in the East.

Being an amateur plantsman of more than professional skill, Mr. Everitt has made the most of this valley. Needless to say, rhododendrons and azaleas comprise the main interest. The brilliant *Rhododendron Kaempferi*, covered with unbelievable masses of azalea flowers in May, is seen to wonderful advantage against the wooded background and appears in many variations. The garden is spotted, too, with specimens of Ghent and Mollis hybrid azaleas, as well as many of the native American sorts. Along with these are quantities of evergreen rhododendrons, ranging from the hardy American species, through the Fortunei hybrids of Dexter and a number of half-hardy English hybrids to a collection of Chinese species, mainly of the larger and harder sorts.

It is with the rhododendrons of the Fortunei Series that Mr. Everitt's most interesting work has been done. Some years ago he acquired a few plants of the variety "Mrs. Charles Butler," a form of *R. Fortunei*. These had not proved thrifty in a nearby nursery under exposed conditions, but they developed beautifully in this sheltered garden. Thus encouraged, Mr. Everitt acquired seed-flats full of young plants raised by Mr. Dexter on Cape Cod. Growing these to maturity by methods similar to those of Mr. Dexter, Mr. Everitt soon had hundreds of the Dexter hybrids blooming in his valley, with others annually coming into first bloom. The older ones are now six to eight feet high. He also has specimens of some of Dexter's foundation stock, including Number 9, which has seldom been improved upon in any subsequent offspring.

This Number 9 of Dexter, one of the first seedlings from his original plants, combines a salmon-pink color and a delightful fragrance. It possesses a definite yellowish suffusion, and this

leads one to believe that it may have *Rhododendron campylocarpum* or some other yellow rhododendron as an ancestor. This is mostly speculative, however, as definite records are lacking, and I have observed that most "guesses" regarding the parentage of hybrid rhododendrons are far from correct. But in this case the character is known to be definitely heritable and appears in numerous offspring. One or two of these in the Everitt collection are almost white with delicate yellow tinges and are, in my estimation, about the best in the whole Dexter assortment. I believe that most of them will trace back to Number 9. It should be noted that this plant, and many others having fragrance and a yellow tinge, are good for seed-parents only, since they are pollen-sterile, having malformed, abortive or impotent stamens. Blooming early, before pollen of hardier sorts is available, this situation makes it difficult for a plant breeder to use them.

These Dexter hybrid rhododendrons offer immediate possibilities for the Pacific Northwest and other regions free from extremes of temperature. How they might do in the South is still questionable, as I do not know of their being tried there. But for the East and Northeast—in fact, for anywhere in America east of the Rockies—they must have further development in the direction of hardiness before they can be put to general use, except in favored sites. At Dexter's and at Everitt's they are in most favored surroundings.

Hybridization of the Fortunei Series with *Rhododendron catawbiense* or the Catawba hybrids can be expected to yield little of value if we are to accept past records which show disappointing results. But when, in 1927, the variety Mrs. Charles Butler was crossed with *R. maximum* by the writer, interesting results ensued. Recently, by using

special techniques, several hybrids between the Dexter plants and *R. maximum* have been obtained by us. While this is not expected to improve the appearance of the Dexter hybrids, it is hoped that it may be of considerable value to *R. maximum* and thus of value to the many American gardeners whose rhododendrons must be of the ironclad type. For, be it noted, no evergreen rhododendron species from abroad, except *R. Smirnovii* and a very few others, mostly unattractive, can even yet be regarded as reliably suited to the climate of New England, the North and the Middle Western United States.

Since the purpose of this article is mainly to discuss the Dexter Fortunei hybrid rhododendrons, other features of Mr. Everitt's rhododendron garden must be treated separately at some other time. But in passing, it might be well to mention a few noteworthy plants, first among which is *Rhododendron auriculatum*, which blooms on the first of August with large, white, lily-like flowers; and seedlings from *R. haematodes*, rather dwarfish, which are almost cherry-colored, something like the color of *R. Kaempferi*, but a bit darker and duller. There are quite a number of other Chinese species, mostly of the large types. Then there are some excellent plants of *R. keiskei*, a Triflorum from Japan with pale greenish-yellow flowers somewhat smaller than those on *R. carolinianum* but looser and more azalea-like. Anyone expecting a rich yellow color in these or in the large hybrid, "Goldsworth Yellow," also present, will be disappointed with these weak yellows. I prefer yellow azaleas. There are also a number of good English hybrids, not fully hardy elsewhere in the North, among which "Bagshot Ruby" and "Cynthia" are good reds, and "The Bride" is a superb white. There is a Maximum

hybrid in the collection, however, that probably merits wider usage in this country, and it is called "Mum." It blooms late and has large trusses of fine white flowers, twice the normal size of *R. maximum*, surmounted by a conspicuous bright yellow color pat-

tern on the upper lobe. While not so hardy as *maximum*, it may be all right. It was produced by J. Waterer in England and bears evidence of partial *R. ponticum* ancestry.

CLEMENT G. BOWERS

July 20, 1945

Narcissus Notes

B. Y. MORRISON, *Editor*

The section for Daffodil Notes is deliberately short this time, because it is the intent of the Editor to use it chiefly in an appeal to all members who are concerned with this flower to send in their own notes for the coming issues. The time to make daffodil notes is in flowering time and that will soon be upon us, even those of us who live in the most temperate sections of the country.

It is hoped that we can gather enough material this Spring season to warrant the printing of another Daffodil Yearbook, and that will depend very largely upon what each one of us does this Spring. Even if last year's planting was limited, there are always notes to be taken on the old and familiar varieties.

We have daffodil fanciers and amateurs in every part of the country. There should be no dearth of interest or of material. If you have a show, a report of the show will be welcome. If you are a beginner, let us hear what has done well and what has not. If you have violent prejudices, air them. If you are firm in your admirations do not fail to report. If you are raising seed-

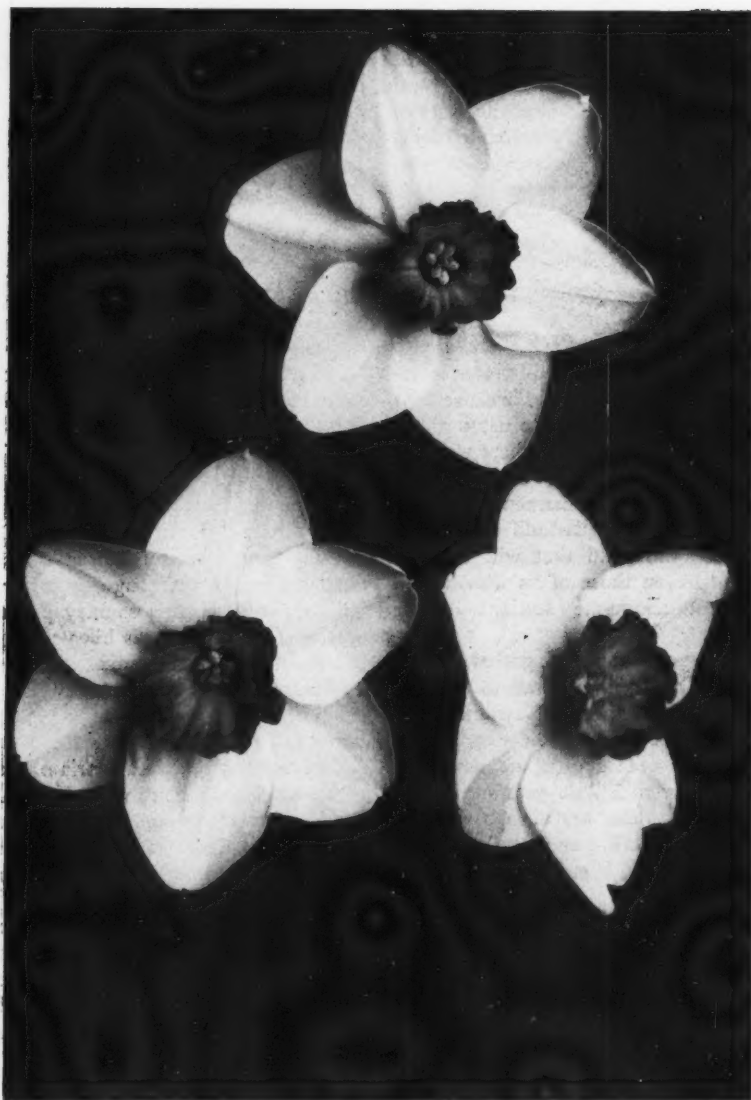
lings, tell us about it. If you are a collector, tell us the basis of your collecting. If you live far to the North or South, that will give interest also. This is for you personally.

Narcissus, Forfar (See page 80)

This very beautiful flower was introduced many years ago, but is not much in trade in this country perhaps only because no one has boomed it. It is late-midseason in opening its blooms and none-the-less suffers not at all in comparison with the many colored flowers of that time.

The very symmetrical perianth segments are nearly white with no stain at the base near the cup. This is small, fluted, and a deep orange yellow overlaid from the margin with deep red orange. If the flowers are picked in bud, there is more of this color. Those in the photograph were gathered out of doors and were not given any treatment "for showing." They had only the usual overnight drink of water in a deep pail set in a cool place.

The variety multiplies well and has as much vigor as the "standbys" so that it should be popular everywhere.

*Robert L. Taylor**Narcissus, Forfar*

[See page 79]

Cactus and Succulents

WILLIAM G. MARSHALL, *Editor*

Christmas Cactus

Very few of the 1,600 or more species of cacti are known by a common name. The Christmas Cactus is an exception of almost universal use though botanists disagree as to its proper scientific name, some calling it *Zygocactus truncatus* while others, especially in Europe, call it *Epiphyllum truncatum*.

The name Christmas Cactus is appropriate because this species bears its numerous, colorful flowers from October to January, with the heaviest crop just around Christmas time.

Zygocactus truncatus is native to the mountains in the State of Rio de Janeiro, Brazil, where it is epiphytic on forest trees or lives on shaded shelves of cliffs, in either case living on humus deposited in tree crotches or rock interstices and on the tropical rains of almost daily occurrence.

The terminal branches are thin, leaf-like, glossy-green joints about 2 inches long by 1 inch or more in width and with 2 or 4 acute teeth on each side of the truncate terminal end, a shape which strongly suggests a crab and has caused the plant to be called the Crab Cactus by some. The 2½ to 3 inch, zygomorphic flowers arise from the terminal joints, are of various colors and last about 15 days.

As the branches age they thicken into elliptical, jointed branches covered with brownish bark but never become firm enough to hold the terminal branches erect, for which reason the plant lends itself to hanging basket culture.

As soon as the flowering season is over, usually in late January, the plant

goes into a rest period which lasts from 4 to 6 weeks during which time the stems droop and the terminal joints become flaccid, and some of them may fall off. At this time watering should be reduced to the minimum to prevent the soil from becoming too hard. One light watering each second week should suffice.

When the plant shows signs of renewed activity more water can be applied and the entire plant should be syringed daily. Liquid fertilizer or any complete plant food should be used several times during this period which lasts from about early March to mid-September and the plant should be moved outdoors into a light but shady place as abundant fresh air is needed for free flowering.

From mid-September reduce the water supply to a light application weekly and bring plants indoors where they can be free from drafts and sudden temperature changes. When buds appear again increase the water supplied to each second day but omit syringing and do not move or jar the plant. These directions should produce a heavy crop of flowers.

Each commercial grower has his own soil mixture for Christmas Cactus but a mixture of equal parts of top soil, sharp sand and well aged leaf-mold with one teacup of well rotted cow manure to each gallon of the mixture has proved very satisfactory. If liquid fertilizer or complete plant foods are added each summer as suggested, repotting will be unnecessary for four to five years.

Zygocactus truncatus has a pink to deep red or claret colored flower.



Christmas cactus

Z. truncatus var. *delicatus* has a more slightly larger flower, carmine scarlet or brick-red or carmine in color. *U. truncatus* var. *delicatus* has a more erect growth habit, with narrower, longer joints and bears flowers of a delicate flesh color. *Z. truncatus* var. *crenatus*, also listed as var. *violaceum* has 2 to 4 teeth that are rounded not

acute as in the species, and a smaller, bluish-violet flower.

In addition to these varieties about 60 hybrids are offered of which the following list is recommended by Britton and Rose in *Cactaceae* IV:178 who quote from Nicholson *Dict. Gard.* 1:517.:-

"*Bicolor*, white, edged with rose; *coccineum*, rich deep scarlet; *elegans*, bright orange-red, center rich purple; *melanificum*, flowers large, white, tips bright rose colored; *Ruckerianum*, deep reddish purple, with a rich violet center; *salmonium*, reddish-salmon; *spectabile*, white, with delicate purple margin; *violaceum superbum*, pure white, rich deep purple edges."

Cacti

For more than four years I have found great pleasure in observing different species of cacti thrive under what little skill I may possess in caring for them. It gave me a great thrill to know that these spiny, fleshy little plants were dependent upon me. After experimenting with different varieties I became more acquainted with their characteristics and requirements, namely how often they should be watered, what the proper amount of sunshine is, and the similarity between different types of a specific variety. Soon I discovered that the "Cotton Cactus" like the "Old Man" needs very little moisture while the "Christmas Cactus" and the "Orchid Cacti" grew vigorously when frequently watered. This proved very helpful when making cactus gardens for in order to be successful you must have knowledge of the plants' characteristics so that you can select varieties with similar requirements. Otherwise one portion of your cactus garden should thrive while the rest would either rot or dry up.

My favorite cactus plant is one of the smallest that I have, and after ob-

serving it for more than two years, I have yet to discover what variety it is. Having a diameter of about an inch and being only one-eighth of an inch tall with long silky gray hair offset by miniature black spines, I really enjoy caring for it.

These are but a few of the many examples of pleasure in indoor gardening. Unless you have actually had experience in this field, you can't know what enjoyment there is in it. I suggest that you try it and see.

CARL VLASAK

Cleveland, Ohio

Some Small Decorative Agaves

Agaves or Century Plants are quite well known and familiar to most as quite large plants with towering inflorescences, as in the case of the most popular Century Plant, *Agave americana*, L.

However, there are a large number of species which might be classed as small plants, attaining a size at maturity of from 6 to 24 inches in diameter and more suitable for the smaller garden or collection. Included among them are some of the most decorative forms, those which have white markings on the leaves and in addition may have thready leaves due to the shredding of the leaf margins. It might be mentioned here that the white markings are due to the adherence of cuticle when the leaves separate or split apart from the tightly compressed central bud and varies in degree on different Agaves.

Agave Victoriae Reginae, Moore probably tops them all as most prized and decorative, almost perfect in its symmetry and also handsomely marked. *Agave Ferdinandi Regis*, Berger somewhat resembles the first named, but is a stouter and looser appearing plant. *Agave parviflora*,

Torr. is the smallest of the Agaves found, growing within this country, seldom exceeding 6 inches in diameter, a pretty little plant. It is somewhat surprising to be able to look down at the flowers of an Agave, but the inflorescence of *Agave parviflora* averages about 4 feet in height in cultivation. Often confused with the foregoing is *Agave Toumeyana*, Trel. a plant which may exceed 12 inches in diameter. Another well known Agave is *Agave filifera*, Salm Dyck and its several forms, the most common of which is the variety *filamentosa*, the names in this case referring to the filiferous or thready margins.

Of easy culture and noted for their longevity many Agaves are well worth while, either as pot plants or planted outdoors where climate will permit this.

California

J. R. BROWN

Succulents in Canada

The Abitibi country of northern Quebec, particularly around Amos, is a treeless plain, coldly barren, where winter temperatures hover below zero and July nights may frequently be as cold as thirty above. It is not, therefore, a location in which one would expect to find species of tropical cacti or even the species of succulents from the sunny mountains of Mexico or Peru.

Seven years ago M. Laval Goulet an attorney of Amos became interested in succulent plants through a magazine article which described them and, despite the natural disadvantages of climate, he determined to own a collection of the unique plants and to see for himself the large and beautiful flowers of which he read.

A small glass house was built and a heating system installed with a thermostatic arrangement which rings a bell in his bed room when tempera-

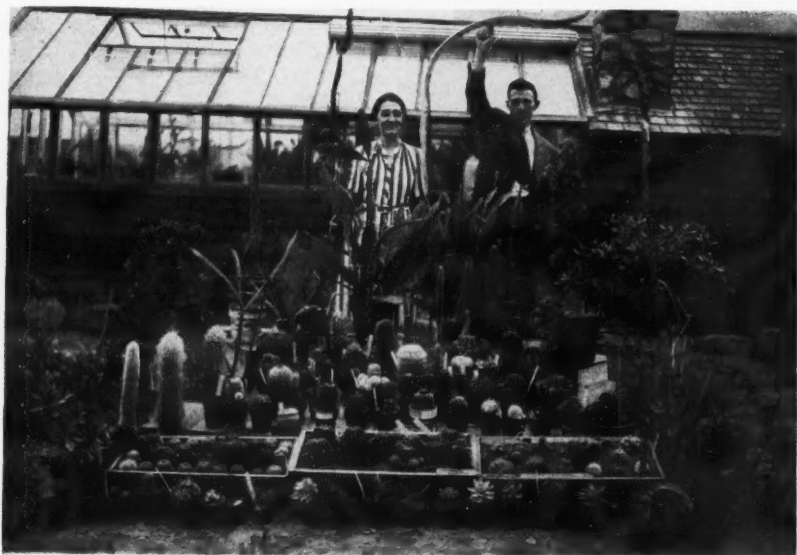


Upper left, *Agave filifera*; upper right, *A. Toumeyana*, and below it *A. parviflora*. Lower right, *A. Victoriae-Reginae*; lower right, *A. Ferdinandi-Regis*.

tures drop to a dangerous low. Plants of many species of cacti and the other succulents were imported and books dealing with their culture purchased and studied. Through the medium of a magazine M. Goulet was put in touch with other collectors in Canada and the United States and from them he

solicited information to meet his peculiar conditions.

Results at first were not too promising but he profited by the loss of a few of his first plants, analyzing the cause of their demise and inventing methods to counteract further losses. Special soils and watering periods were



The Goulet Collection

worked out to suit his unusual growing conditions and today M. Goulet has a fine collection of well grown, fast growing plants which produce numerous flowers for his enjoyment. Needless to say visitors to his glass house are numerous and enthusiastic.

In the photograph M. and Madam Goulet are shown with a portion of the collection with the glass house and furnace room in the background. Immediately in front of them are a few of the tropical, epiphytic types of cacti and M. Goulet points to a plant of *Hylocereus* which has made exceptional growth for him.

The three hairy, columnar plants in the left foreground are, from left to right: *Cleistocactus Straussii*, the silver torch cactus, *Cephalocereus senilis*, the old man and *Oreocereus Celsianus*, the old man of the Andes. Species of *Echinopsis*, the Easter lily cactus can be noted in two of the flats

and the potted species in the middle ground are *Mammillarias*, *Echinopsis*, *Gymnocalycium*, *Parodias* and *Notocacti*.

In the right foreground a species of *Stapelia* unfolds its star-like six inch flower, deep brownish red in color, this flower is best enjoyed from a distance as its fragrance is not inviting. It is a very interesting flower of complex structure and leathery texture covered by sensitive whitish hairs.

Echinocereus Delaetii

When a very attractive plant proves difficult of culture it becomes necessary to find out the conditions under which it survives in its natural habitat. From the following excerpt from a letter from Mexico conclusions can be drawn as to the cultural requirements of the beautiful, but difficult *Echinocereus Delaetii*:

"Last Sunday, July 9th I made another trip in search of *Echinocereus*



Delaetii, and I'm happy to say it was a success. I have felt all along that my stay in Mexico would not be a success unless I saw this species in its native habitat.

I took the highway to Torreon, Coahuila, and about 37 miles from Saltillo left the highway at what is called El Pilar. From there I travelled forty miles over just passable desert road and came upon a guayule camp. I inquired of the natives if they knew of a plant such as I described. They did, so I hired one, Jesus Mata, to guide me. It's a good thing I did because it would have been an unsuccessful trip other wise. We then travelled 8 miles to where the road ended. From there it was a one and three quarter mile hike straight up.

Photo number 1 was taken near the summit, showing the trail and the valley below, which is known as Valle Seco or Dry Valley. It was necessary to cross over the summit to get to the plants. They were growing on the



Photographs 1 (upper), 2 (lower) see page 87

Echinocereus Delaetii country



No. 3, *Echinocereus Delaetii*; No. 4, the party.

slopes on the other side, the exposure being southeast. The soil here was dark colored sandy loam, quite different from the slope we climbed to get there.

Photo number 2 is a view of the mountain where the plants grew. It was quite heavily covered with vegetation for this part of the country. Such plants as Yuccas, Agaves, sotol,

numerous grasses and shrubs were growing in profusion. One of the commonest plants was a species of wild onion which the natives eat. It can be seen in photo. number 3 growing up through the plant of *Echinocereus Delaetii*. There were a number of other genera of cacti growing here also, Mammillarias, Neolloydias, Coryphanthas, Escobarias and several

Opuntias. The combined other cacti were much more numerous than the Echinocereus.

Photo number 4 is of my companions, I never learned the name of the boy to the left. The other two from left to right are Jesus Mata and Joaquin Aviete. Don Jesus was delighted to pose, after I said I would send him a copy. He resembles Pancho Villa in the picture. He and the boy have bunches of an herb, which they use as a substitute for coffee. The

bundle they are carrying contains two plants of Echinocereus Delaetii.

All in all I was well satisfied with the outcome of the trip. It wasn't what I consider a rough trip; however it may be as I am used to such by now. I've fairly well covered 10 states, and mostly no highways, in the past 15 months I have been down here. One of my big regrets has been not to have another cactophile to travel with, but probably in that case I might have forgotten my work.

ROBERT FORES.

A Book or Two

Asparagus Production. Homer C. Thompson. Orange Judd Publishing Co., Inc., New York. 124 pages, illustrated. \$1.25.

A small practical handbook type of publication, written with the express purpose of bringing together the results of all recent research as published in state and federal bulletins as well as technical papers. There are fifty reference citations given in full, at the end of the book.

The Field Seed Industry in the United States. Frank Victor Buck. University of Wisconsin Press, Madison. 1944. 230 pages, illustrated. \$3.00.

Most of the members of this Society may not have a vital first hand interest in the Field Seed Industry, but none could fail to find an interest in this very lucid presentation which touches upon the early history of the production of this type of seed in the States, and the later development and growth of the industry during the period before and through the Second World War.

It is not a book which deals with the business of seed production and no

one will find advice as to how he might enter it and produce seed. It is a discussion of the industry and is limited to the more common grass and legume seeds that go into the common practices of pasturage, hay production, soil improvement and of course the inevitable soil conservation.

Practical Camellia Culture. Robt. J. Halliday. Lithographic reprint, by permission of the original edition (1880); arranged by Robt. O. Rubel, Jr., Crichton, Ala., 1945. 142 pages, illustrated; paper \$2.00; cloth \$3.00.

Many factors have contributed to the present insistent interest in the camellia, which is no new-comer in the country, which need not be discussed here, but there is no question that camellia growers, amateur and professional, successful or less so, do not always see eye to eye, either on cultural practices or in matters of taste, that perilous human arbiter of fashions in the perception of beauty.

This small old-fashioned volume, long out of print, is a usual manual, written from the point of view of the person who lived beyond the area

where the camellia is hardy and who first operated in that period when greenhouse construction was leaving the old stages to come toward the modern house.

If in the near future, more amateurs want glass houses of their own, some of them may find less interest in the highly heated type of house that has been evolved for the winter production of summer growing things and more in the relatively cool house in which so many plants "nearly hardy" can be kept safely and happily.

This volume may concern not only the camellia grower but others. Just how much it or any other reprint will do for the amateur will depend on the amateur; but certainly in this he will find, boldly set forth, a wealth of practical detail for the conditions described.

Horticulture and Horticulturists in Early Texas. Samuel Wood Geiser. University Press in Dallas, Southern Methodist University, Dallas, 1945. 100 pages.

The author, who makes many generous acknowledgments in his Introduction, states definitely what he hopes his book may be and to what it may lead. One can only admire the methods and procedures.

As can be expected, the volume will be of more interest to Texans than to others; and to the historically minded rather than the amateur gardener. The portions that could be and are presented in running prose are good reading: the portions that are statistical remain just that.

For the ordinary gardener, a reading of the text, and particularly the section devoted to the biographical notes, should be an inspiration, since it gives a stupendous amount of evidence that the amateur has given a great wealth of useful material from his own gardening. He, the present

day reader, may even be persuaded that his garden, his own small plot, may be the scene of horticultural endeavor of significance rather than just the scene of his personal satisfactions.

Monography of the Genus Camellia.

The Abbe Lorenzo Berlese. Reprint of the 1938 Translation by Henry A. S. Dearborn. Published by Joseph Brech & Co., Boston, 1938. 110 pages.

New Iconography of the Camellia.

Alexander Verschaffelt. 1848-1860. New translation by E. A. McIlhenny of the texts. 318 pages. Privately printed: E. A. McIlhenny, Avery Island, La.

These two European works, almost completely unavailable, now have been prepared and published by Mr. McIlhenny, who has for many years been a student and collector of the camellia.

The present day amateur, and most particularly those amateurs who may have to labor in the always hazardous field of the study of varieties remaining in cultivation in our South and Pacific Coast, owe Mr. McIlhenny a particular debt. Their task is and probably always will be a thankless and difficult one, with a "percentage of error" for which there may be no statistical salvation!

The Berlese text has a considerable part on cultural practices; the Verschaffelt text a brief treatment by Auguste van Geert, another notable horticulturist of that time.

To the person who knows nothing of camellias and who can't even have them, all this will be very dull going; to the amateur who is not vitally concerned, it will be interesting only in so far as he is historically minded; to the serious worker, however opinionated he may be, the two volumes are musts!

The Rhododendron Yearbook for 1945.

Published by The American Rhododendron Society, Portland, Ore. Edited for the Society by Dean Collins. 144 pages, illustrated: for members.

The American Rhododendron Society in its first volume reflects chiefly the activities of a small group of people in Washington and Oregon, who, quite aside from being excellent gardeners, have a climate or climates that are to the liking of the species of rhododendrons that the British gardeners have known and grown for years, and for the hybrids that have been evolved from certain groups of these species.

All the papers are of great interest but by and large are texts to sadden those of us who live beyond that "misty-moisty" and not too arduous realm. Mr. SeEVERS alone speaks for the "less favored" areas.

The book is ambitiously set up, but the illustrations leave much to be desired. As we move away from the war years this undoubtedly will improve.

If you are a collector of rhododendron books, you should have this, no matter where you live; if you are not a Pacific-Northwester and want only what concerns you, you needn't bother; but if you support horticulture, you should give it your support.

Cinchona in Java. Norman Taylor. Greenberg, Publisher, New York, 1945. 87 pages, illustrated. \$2.50.

This is a rather slender book, scarcely more than a novelette, and can be read as quickly. In it there is much that has nothing whatever to do with "Cinchona in Java" save to give the setting, and the "motif" for the setting might well be stated as Dutch astuteness. Thanks to them, the cultivation of cinchona and the resulting commercial production were saved.

The skills that were developed in Java, and which fathered the practices that have proven so lucrative, are sound. Fortunately they are not exclusive, but they may remain exclusive and unique if the amazing industry of the Dutch producer and the skill of the Dutch merchant princes are not paralleled.

The book is written for the lay reader, not for the technical man, though the latter will recognize the salient matter. It cannot be used as a "how-to-do-it" book except by those who almost know anyway. The style is easy and pleasant and if one were to quibble at all, it would merely be that there are too many flat assertions!

Plant life of the Pacific World. Elmer D. Merrill. The Macmillan Company, New York, 1945. 295 pages, illustrated. \$3.50.

Among the things that have come to us as a people from our participation in World War II has been the projection of many individuals into geographic regions which had been as far distant from their former private lives as any star. To those who went, much happened besides the physical and emotional stresses of each period; to those who remained, there has been always an undercurrent of anxiety more or less active, more or less personal, about that new life into which "our" man or woman was projected.

To the gardener, here and now, Dr. Merrill's work, written from the richness of his long and careful experience and study in the Pacific world, in the present volume, will evoke a safer and sounder image of the plant world in which our forces moved and lived. It opens to the reader enough to remove that primitive fear that we all have of the unknown.

Of the plant life itself and its possible impact upon our gardens here, not

much can be said. The knowing gardener will recognize some names throughout; the gardeners from favored areas, frost free though drought or hurricane ridden, may recognize species now introduced, not only here but elsewhere, for they, like many other tropical plants, have their part in the circle of distribution, usually man-directed, about the globe.

Whether you care or not from the basis of your own private or garden life, you will find the book good reading, and if you like good reading, as all intelligent gardeners do, you will find citations to other works which may provoke your future visits to the library in search of new titles and new vistas into worlds new for you.

Trees, Shrubs and Vines, for the Northeastern United States. George Graves. The Oxford University Press, New York, 1945. 267 pages, illustrated. •

This is published under the auspices of the Massachusetts Horticultural Society and is a most valuable manual.

It is pocket size and well organized. The Introduction tells exactly what the author intends doing and how he set about it. It also states the manner in which the book is to be used.

The major portion of the book is given over to brief descriptions of plant material, beginning with *Abelia* and closing with *Zenobia*. There are relatively few illustrations but they are excellent. The text which must have cost the author many an hour of travail in deciding what to say and what to leave out, is very concise without ever becoming dull. It has the further grace of not being dogmatic, even when the opinion is most firmly set forth. It is singularly free of "gush."

The balance of the work is given over to lists with brief texts, and a few useful chapters, on care and maintenance.

There is no definition of what the author means by Northeastern United States, and there are included a few plants that would hardly seem to warrant inclusion in the area which the reviewer would call that area. The comments on hardiness under various plants are much to be commended.

The Gardeners Pocketbook

Pinguicula vulgaris (Butterwort)—
An Insectivorous Plant

The little flowers of the Butterwort Family are known over a wide range. They are found among moist rocks or the edges of gravelly streams in Europe, Asia, North America and along the Andes to Patagonia. The one illustrated was flowering in Alaska but the flower is known sometimes as the Labrador Violet, showing that it is of wide distribution. It is found among the mountains at the lower altitudes. Another common name is the Bog Violet.

The Butterworts are among the insectivorous plants, coming between the type which hold insects by sticky hairs, such as the Droseras or Sundews and the Dionaeas or Venus Flytraps, which close their hinged leaves upon their victims. The Butterworts attract insects by the sticky surface of their leaves but the leaves then roll up, enclosing the unwary visitor.

Pinguicula vulgaris is a small stemless perennial with basal entire leaves, the upper surface covered with a sticky secretion on which insects are caught. The leaves are pale yellowish-green, 3-7 in a rosette, greasy to the touch, 1-2 inches long, $\frac{1}{4}$ inch wide. The flowers grow on scapes 1-5 inches high and are bright blue, rarely purple, with a darker throat, lined with silky hairs. They are 2-lipped, the upper lip 2-lobed, the lower 3-lobed, larger, the tube gradually contracted into an obtuse or acute, nearly straight spur, $\frac{1}{3}$ inch long.

Occasionally grown among moist rocks or in bogs in gardens, where they are propagated by seeds or offsets.

The leaves of *Pinguicula* contain vegetable rennet and Linnaeus says that the leaves of *Pinguicula vulgaris*

were used by the Lapland tribes for curdling milk. The same custom is said to prevail among the peasants of the Italian Alps. Ada White Sharpless says, in "Alaska Wild Flowers," that "leaves disappear in winter and beneath the snow a fat nodule of greenish scales remains underground like a pseudo-bulb."

SARAH V. COOMBS.

Scarsdale, N. Y.

*From the Midwest
Horticultural Society*

Flowering Peach

Perhaps the most brilliant colors of all flowering trees are on the flowering peach. While some nurseries offer by named variety, most list by color. Usually three colors are listed: white, rose pink, and bright red.

The flowers are double and resemble those of a flowering cherry. The foliage and growth habits are identical with the ordinary peach. The plant is rapid growing and prefers a well drained soil. The flowers appear in early spring before the leaves.

Like the other peaches the flowering forms grow into fair sized trees and are not especially long lived. They may also suffer occasional winter damage. In spite of these objections there is a fine landscape value in them, and the initial cost is usually low. Their use would be restricted to larger gardens and country homes.

During the latter part of April there would be a magnificent show particularly as the colors are sharp and clear.

Flowering Quince

The flowering quince is one of the old fashioned plants that has not retained as much of its popularity as de-



Maxcine Williams

Pinguicula vulgaris

[See page 92]

served. Perhaps this is due to the slow growth of the plant and to the attacks of rabbits who seem to prefer the stems of young plants. However there is some indication that the plant will make a comeback as newer varieties have been produced with different colors, and some with dwarf habit. Colors available range from deep rich red through several pinks into pure white. Single and double forms are available for most of them.

The flowers are a good size and produced in the North before the foliage in earliest spring. The foliage is dark green, glossy and quite attractive. The stems are dark skinned, shiny, with a few thorns. The bush normally is erect to spreading. Dwarf forms are rounder and compact.

Ordinary soil and an open position are all that is required. This is one of the most admired shrubs when seen in early spring but is not too common in many gardens. Possibly some of this lack of small and medium specimens may be traced to the stupid attempt to call this firebush and cataloguing it as such by some firms.

Rarely a hedge can be seen of this, while losing some of the flowers in the inevitable trimming the effect is still good when in bloom and as a different and attractive hedge it is very good.

Some thoughts on Cemeteries

One of the earliest of the park-like cemeteries in this vicinity is Mt. Greenwood located on the southwest edge of Chicago. This cemetery is now some seventy or more years old and was laid out on a series of low sand hills covered with a stand of white, bur, black, and red oaks and an undergrowth of crabs, hawthorns, and wild blackberry. Into this setting has been introduced attractive winding drives and many plants to supplement the natural beauty of the spot.

Evergreens had not reached the popularity in the early days of this cemetery that they now enjoy and consequently there is not the abundance of them in the landscape plantings as found elsewhere. Rather offsetting the lack of variety in mature evergreens is a magnificent grove of white pine near the entrance. Even closer to the gate is a fine clump of white birch. The birch is found distributed throughout the older plantings of the grounds and is especially attractive among the dark stems of the oaks. There are several groups of flowering dogwood distributed about the grounds. In the western portion of the older plantings are found many excellent specimens of the weeping elm. The stiff umbrella crown of these gives an artistic touch in the landscape that is excellent. In this same general area is a clump of Kentucky coffee tree on a point between drives. In the center along a drive is a good specimen of Sweetgum. Here and there are specimens of English oak, Norway maples, elms, Chinese elms and many of the common shrubs have been used freely. On the lots and apparently planted by the owners are such different things as European filbert, dwarf ninebark, several varieties of dwarf and low growing junipers, spreading and columnar yews, forms of arbor vitae, and many other relatively common species.

About a half mile from Mount Greenwood and lying on the same line of small sand dunes is Mount Hope which is somewhat newer dating back only to 1885. This cemetery shows the influence of evergreens very strongly. There are many excellent groups of Scots Pine, white pine, and large specimens of Mugo pine. The Mugo pine is especially interesting as most of them are about ten or more feet high and equally broad. There are many spruce averaging fifteen feet.



Robert L. Taylor

Nigella damascena
Natural size

[See page 96]

They are mostly Colorado green but interspersed are fine blue specimens. In many spots the blue form has been used as an accent with several of the green forming a background. A few red-leaved plum have been introduced into the landscape. Tulip tree has been used in some areas. There is a good planting of Oregon hollygrape and some of the species lilacs.

Here again elms, Norway maple, Chinese elms and many rather common species of shrubs have been used. On the lots where they have been planted by the owners are many kinds of evergreens, similar to those in Mount Greenwood.

While cemeteries may be depressing to some because of associations yet the cemeteries as a group provide an excellent opportunity to observe the use of plant material in the landscape and to see their behavior when left with a minimum of care for a reasonable time, as most cemeteries do not have the time or labor to do more than prune and spray the landscape material at intervals. Frequently the material in cemeteries may be different from that commonly grown as the planning is usually done by well-known landscape architects.

Certainly the larger and older cemeteries are becoming more and more like arboreta and bird sanctuaries which serve as an inspiration to the plant minded as well as an unconscious solace to everyone.

ELDRED GREENE.

Nigella damascena (See page 95)

Love-in-a-mist is the homely name by which this old-fashioned and much neglected annual was called, when in flower; but devil-in-a-bush is its name when the plant has given over flowering and devoted itself to the ripening off of its inflated seedpods.

As compared with zinnias, marigolds and petunias, this poor Old World annual would never have a chance to compete, but in the not too tidy garden, the sort of place that is taken over by self sown seedlings, it has a very definite place. It is of the easiest culture, if one or two things are remembered.

The seeds are large and black and germinate well in early Spring. It is quite safe to sow them as early as one would sow annual poppies. Light freezing will delay the germination, but as soon as the temperatures suit them, the seedlings appear with rather large seed leaves of a tender green color. The young seedlings do not like transplanting, so if you have not sown the seeds thinly, pull up the excess and don't bother to transplant. Only stunted plants will repay you. Growth is steady and fairly rapid, with flowering on the principal stalk within a month, and the branches coming along rapidly. By the end of June, the life cycle will be finished here, Washington, D. C., and the plants can be pulled up.

Buy good seed and cull out all plants that show a poor color. The best hues start with aquamarine and deepen to almost purplish blue. All the paler tones are insipid. Be as harsh about this as you should be with all the silly new "art shades" in cornflowers, and the self-sown seedlings that come up the following Spring will be decent colors and not all pale hues.

There was a time when a strain named for Miss Jekyll could be had and perhaps it will appear again, although the present generations may not even recall the famous British gardener for whom that stands! And there are other species of *Nigella*, but they rarely come into commerce and probably would not be too intriguing.

The flowers last quite well when cut or rather the secondary buds develop well enough so that a cut spray pre-



Robert L. Taylor

Impatiens Balsamina
Natural size

[See page 98]

sents a good appearance for some time when kept in water.

The photograph shows the details of the plant and flower habit and those of the seed pod as well. It also records a strain of merely ordinary value, as flowers in good strains should have many more colored bracts. If the size were not so different, one might think of a fine clematis flower-in-miniature, set down upon a fine green ruff.

In adversity, whether of poor soil or drought, this is one of the annuals that will make one flower on a tiny stem, mature its seed and die. In some plants this is intriguing, in this one starvation is too obvious.

Impatiens Balsamina (See page 97)

This is another old-fashioned annual that has fallen on neglectful days. It was once common enough in dooryards and had the attention of many a faithful gardener who bought good seed, fed his plants well and expected a certain level of performance.

It is a good plant for a beginner, a very beginner. The seeds are large enough to be easily handled, can be planted late in the season. They germinate quickly in warm weather (they stand no frost in this stage) and the seedlings are large enough to transplant as soon as they have germinated.

The plant illustrated in the figure is from ordinary seed. In fine strains bred and maintained "before the war" the individual flowers would have been more symmetrical and more completely double so that they sat like small camellias along the stem. Many flowers are produced in the axil of each leaf so that blooming continues for a long period, all through the hottest weather during which the plant shows no sign of unhappiness, unless you skimp it on water.

Since most of us live where the summers are hot, this tropical annual is not

to be despised. If you don't like the colors you get, save seed from those you do like until you get your own strain. If you prefer singles, chose only those.

The colors that came in the seeds from the ordinary package were white, several tonalities of pink all on the coral to peach side, and red. There were none of the remembered magentas, nor any of the spotted forms. There were no full doubles. Cutting off a whole plant or a main stalk in flower, one may have them in the house for at least a week. The old flowers fall quite decently and neatly and new ones take their place. Or one may cut the single flowers and float them, if one likes that form of decoration. Or again, one may arrange them, in moist sand, so I am told, until the whole dish is filled looking like an old fashioned nosegay without the paper frill.

Children, and not a few adults like to touch the ripened half translucent pods and watch the seeds scatter!

But the chief interest in the little planting last year was in the fact that our first early frosts did not hurt the plants but seemed if anything to intensify the colors.

Reprints.

On pages 99 and 100 are reprinted photographs engraved for use in earlier issues, one is *Shortia salicifolia* and the other is a fruiting branch of *Cotoneaster salicifolia*, which was shown in its flowering state in one of the recent issues. It illustrates a nice point, namely that evergreen leaves are not eternal! If one compares the number of leaves per spur in the flowering branch with those in the fruiting, he will see for himself. *Shortia*, we need not remind you, is one of the most lovely of native plants, with a pleasant history as well.



E. T. Wherry

Shortia galicifolia



L. A. Guernsey

Fruits of Cotoneaster salicifolia

Wanted!

Seed of the old fashioned Banana Muskmelon. The modern streamlined improved, etc., are not wanted.

A. E. KUNDERD,
R. 2, Box 48, Goshen, Ind.

Decorative Grasses. Seeds or plants together with anything printed in connection with this subject.

L. C. VIRGIEL,
906 Iliff Street,
Pacific Palisades, Calif.

Wanted, rare varieties of cacti, succulents, and other house plants. I have quite a large collection and am always looking for new varieties.

CARL VLASAK,
4150 E. 116th St.,
Cleveland 5, Ohio.

Seeds, cuttings or young stock as may be most desirable.

Quercus cornea,
Alocasia macrorhiza, true type
A. macrorhiza variegata
A. cuprea
A. Sanderiana
Callicarpus sp. (Tree scarlet fr.)
Cyperus alternifolius variegatus
Cryptostachys lakka
Citrus ichangensis
Citropsis spp.
Atalantia spp., esp. *A. Guillauminii*
Glaucena lansium or *wampi*
Aegle marmelos, the Bael of India
Aegelopsis chevalieri
Balsamocitrus Dawei
Hesperathusa crenulata
Feronia limonia, the wood apple
Feroniella lucida.

All material will be purchased at prices mutually agreeable.

M. MORAN, Star Route,
Bay St. Louis, Mississippi.

Indian Azaleas

The editor himself would like to hear from members who are growing or who are familiar with named varieties of these useful Southern shrubs, that may not be available through regular nursery channels or only from small local nurseries that do not issue catalogues. If you have such varieties in your own garden or if they grow in your neighbor's garden, a letter will be appreciated, telling particularly, where plants can be bought if such are available.

The editor would also like information as to the use of the common old Azalea, which is known as *indica alba* in many gardens, but which does not really belong in the "indica" group, save from an historical point of view.

It seems desirable to begin a collection of all such information, in order that a complete check list may be worked out and some record be made before it is entirely too late. It is repeatedly said that varieties survive in our South that have long been lost in Europe; this is probably true but in some cases the varieties have been surpassed by later forms more amenable to the florists' uses and less useful out of doors.

The editor would also be interested in hearing from any member about this type of plant, particularly the hardiness of the varieties that the member may be growing, hardiness being understood in this case as resistance to frost in spring for the developing flowers and in winter for the plant itself, particularly the one-year wood.

In coming to the publication of Volume 25 of the NATIONAL HORTICULTURAL MAGAZINE, it seems well to take one page to record the appreciation by the Society and the Editor, of the unfailing support of the Members who have made the Magazine what it is. To each person, who has contributed to the work, our sincere thanks.

The problems that have confronted us in the work have not been few. Probably the chief difficulty has been that of winning more and more people to the belief that in spite of the great size of our Country, it is possible to interest gardeners in all parts of the Country in the work that is being done over the whole. Not all are convinced as yet and there are many gardeners who still do not see beyond the immediate horizons of their own neighborhood, unless it is to see something that they must bring into their own gardening from elsewhere.

It is true that gardening as a whole has had an enormous development during these years in which war and serious depression have marred the ordinary expressions of individual life. If it were not an apparent paradox, it might even be argued that these have aided in the growth of horticultural pursuits. Some horticultural activities have had to be held in abeyance, but others have been stimulated and more persons have turned to gardening than ever before. For those to whom this was a truly first experience, it has been a revelation of a world new and splendid in ways they may not have expected.

It is true also that science has turned an attentive eye to the garden world and that the skill of the scientist has been added to those other skills that have already been in action for centuries.

What lies before us, is not for present prediction. Of one thing we may be certain, however, and that is that in the gardener's hands is the safekeeping of much beauty, something that cannot be underestimated in the life of any people.

In one friendly letter of criticism, it was urged that the Society had no slogan! It seems to some of us that it needs no slogan, but if it must have one, why not urge merely a quickening of the sense of beauty that can be found in this garden world.

In the twenty years that the Magazine has been in the hands of the present editor, it has grown but it has not achieved the full stature that it will attain. It has grown, however, as we have said before through what the membership has done, in which we have been only the agent. It is pleasant to know that in the years to come, others will join the groups that have already made so much progress toward a national goal and that the present group need have no fear, since the goal does not change.

B. Y. MORRISON, *Editor.*

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